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REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURAL ECONOMICS

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF AGRICULTURAL ECONOMICS,
Washington, D. C., September 11, 1929.

SIR: I have the honor to transmit herewith a report of the work of the Bureau of Agricultural Economics for the fiscal year ended June 30, 1929.

Respectfully,

NILS A. OLSEN,
Chief of Bureau.

Hon. ARTHUR M. HYDE,
Secretary of Agriculture.

The work of the Bureau of Agricultural Economics was expanded during the past year along a number of lines. New activities were provided for by legislation, and the service and informational work were broadened by means of increased appropriations. Significant progress was made in the expansion and redirection of research to meet the most pressing needs for information and assistance in readjusting farm and marketing methods to new conditions. At the close of the year work was in progress on 287 projects, each covering a definite problem in the economics of producing or marketing agricultural products.

The Federal Farm Board has recently been set up as a new instrumentality to assist in solving the problems of American agriculture. Evidently it was intended that the board should translate into action the results of service and research. For the formulation of these programs of action, the board must have comprehensive, reliable information on all economic phases of agriculture. Its declared policy is to look to this bureau for such information. The fact-collecting and research activities of this bureau already have been broadened as a result of the board's requests. In fact, in order to make

immediately available needful information, the board has indicated its willingness to provide this bureau with additional resources. Among other things, the board has requested the Bureau of Agricultural Economics to establish, as soon as possible, an adequate foreign agricultural service, co-operating with all other departments of the Government, and has indicated its willingness to support this work until such time as permanent provision for it can be made.

The bureau's activities during the past year in no small way have sought to provide information required in the handling of the economic farm problems. Price analysis and its application in outlook and price-situation reports has been further developed. Intensive studies regarding the most effective use of land in areas of low agricultural productivity have yielded encouraging results. Adjustments to the economic outlook and such factors as improved machinery, new methods, and the like have been furthered by investigations in the field of farm management. Increasing attention has been given to studies in the marketing of agricultural commodities, with a view to eliminating uneconomic methods and practices. Particular emphasis has been placed on fundamental research in the field

of cooperative marketing and assistance to cooperatives in the solution of their problems. The resources of the bureau, as a whole, have been to an increasing degree coordinated and concentrated upon the researches in the fields of general and cooperative marketing.

The first specific appropriation for agricultural outlook work was made for the past fiscal year. Previous to that time such a report had been prepared by members of the staff who were engaged in other work. The new appropriation made possible the employment of additional specialists to devote their entire attention to gathering, assembling, and analyzing data bearing upon the agricultural situation. Much statistical and analytical work remains to be done before the bureau will be in position to meet fully the demands for economic information needed as a basis for intelligent planning of farm operations. The outlook report for 1929, which was issued in February, was enlarged to cover in condensed form the results of analyses of all available data for 38 of the most important farm products or groups of products. These data covered both domestic and world conditions of supply and demand and pointed out the probable future trends in production and prices. Farmers were advised as to opportunities for profitable expansion of certain activities and warned against overexpansion of others. A large number of State agencies cooperated with the bureau in this work and published further detailed information for the benefit of their particular States and sections and used it in making specific recommendations for reduction or expansion of acreages of various crops.

An increasingly important factor in the preparation of outlook reports is the information on agricultural conditions in foreign countries. All available data are obtained through the Consular Service, the International Institute of Agriculture, the Department of Commerce, foreign correspondents, and the bureau's foreign marketing specialists as a basis for estimating the probable future trends of production and consumption of agricultural products.

Progress has been made in developing a crop-reporting service for foreign countries through the bureau's foreign representatives and other agencies. Effort has been made to obtain information with regard to agricultural re-

sources of foreign countries, prospective developments in foreign production, conditions which affect the demand in foreign countries for American agricultural products, and other data of vital interest to American farmers. This information has been combined with the crop and livestock reports of the bureau and has furnished the basis for appraising world conditions for agriculture and the probable future competition which American agricultural products must face.

Studies of farm taxation yielded valuable results. These studies showed the need for shifting a part of the burden from agriculture to other industries which are better able to carry it through new forms of taxation or revisions in the present taxation systems. The facts brought out pointed also to the possibility for greater economy in the use of public funds.

Studies of agricultural credit have disclosed that local money shortages hamper farmers' operations, and that farmers often pay exorbitant rates for credit when they buy goods on time. Recommendations have been made that farmers should discontinue their store-credit operations as far as possible, and establish connections with local banks where credit may be had at lower rates of interest. Much research and educational work needs to be done in order to bring about wise use of credit by farmers and in order to make it possible for them to obtain such credit at reasonable rates.

Improved methods have been devised for estimating acreage changes, and in forecasting crop yields. Statistical research applied to crop estimating is a new field relatively, but the work thus far accomplished has resulted in greater accuracy in the reports and in economy in handling the large volume of necessary data. Special studies have been made to meet new needs. A study of the factors affecting the size of apples in the Hood River apple district of Oregon, for example, was completed during the past year, and the results will be used by the cooperative apple association in the valley in making their sales contracts during the current year.

The first full year's work was completed under the act providing for estimates of the grade and staple length of the cotton crop and of the carry-over on August 1. The reports issued were of great interest to cotton

producers and others, since they made available for the first time adequate information on the quality of cotton on hand and of the current crop. As an illustration of the value of the service, it was shown that approximately one-sixth of the 1928 crop was undesirable on future contracts, the greater part of this quantity falling short of the required seven-eighth inch length. More than one-half of the total 1928 crop was of seven-eighth inch length or shorter. Experiment stations and other State agencies are using the reports of the department to guide them in their experimental and educational work.

A new section has been established in the bureau to handle problems relating to the tobacco crop. Although this crop has a very high monetary value, practically no economic research has been possible up to the present time, and the information made available on production and supplies had been inadequate. Under the provision of the tobacco stocks and standards act, approved January 14, 1929, quarterly reports on stocks of tobacco have been issued. These reports segregate the tobacco by types and show a separation between new and old crops. The act authorizes the promulgation of official standards, among other provisions. In addition, the agricultural appropriation act provided for the inauguration of a grading service for tobacco similar to those for fruits and vegetables and other crops. Arrangements were being made at the close of the year for the inauguration of the service in cooperation with various agencies.

The work of preparing and demonstrating standards for farm products has gone steadily forward, as well as educational work in bringing about better methods of handling and marketing. Although the bureau has been working in this direction for a number of years, only a small percentage of farmers market their products under standardized grades. The farmers' cooperative associations are bringing about a great improvement in this respect, however, and State agencies throughout the country are cooperating with this bureau in bringing about the general use of uniform standards for farm products. Much educational work has been done in reducing waste and losses in the marketing of perishable farm products, through adopting improved practices. The bureau works continuously on the development of more efficient methods and gives ad-

vice and assistance to farmers putting new methods into effect.

The United States grain standards act has been in operation since 1916 and has come to be a very important factor in the marketing of grain. It has seemed desirable to make an impartial study of the operation of this act; consequently, late in the year a committee was appointed which is now making a survey of the entire field for the purpose of ascertaining what steps, if any, should be taken to improve the service. It is expected that the committee will report upon its findings within the next few months.

A greater demand than ever before was noted in the various service activities of the bureau. A total of 266,831 cars of fruits and vegetables was inspected and certificates issued covering quality and condition, as compared with 243,262 for the previous year, and inspections of other products increased proportionately. An experimental grading service for rice was inaugurated in cooperation with the States of California and Texas. Federal grain supervision offices passed upon the grade and issued certificates for 84,135 lots of grain, some of which involved large quantities of grain shipped in bulk by vessel or barge, as compared with 80,618 the previous year. The boards of cotton examiners classified 446,181 bales of cotton tendered for delivery on future contracts, which is the largest quantity tendered for a number of years.

The market news service was expanded by extending the leased wire telegraph service to Montgomery, Ala., and to Sioux City, Iowa, and preparations were being made at the close of the year to extend the leased wire to Portland, Oreg., Seattle and Spokane, Wash., Boise, Idaho, New Orleans, La., Cleveland, Ohio, and Detroit, Mich., and to provide connection at several additional points where State officials will receive the information and give it wider publicity for the benefit of their localities. A greater volume of current market information was disseminated during the past year than ever before.

Detailed information and specific results of the bureau's work will be found in the bulletins and periodicals which have been published. The statements in this report which follow under each of the major divisions of the bureau, outline in general the scope of the work which has been undertaken and some of the more significant results.

DIVISION OF FARM MANAGEMENT AND COSTS

C. L. HOLMES, *in charge*

The work of the Division of Farm Management and Costs is concerned with the economic problems of the individual farmer and with the business organization and management of the individual farming units. Its research work is concerned with the problems of determining the use to which the farmer shall put his resources in terms of cropping programs and livestock systems. It points out the best and most efficient financial and technical organization of agricultural business units and the most efficient methods to be followed in the production programs. It is concerned with studying the efficiency of agricultural production, and with the price outlook as it affects the farmer's production program both from a long-time point of view and from the point of view of year-to-year modification.

That the division may function to best advantage in the research field, studies have been made of the broader aspects of agricultural development, both as a whole and by regions and localities. The historical and geographical differentiation to be found in farming and the range in type of farm organization at any given time and within any given region are of outstanding importance in determining the best organization and management of farms, and special attention has been given to these subjects.

TYPES OF FARMING

Studies looking toward the measurement of shifts in types of farming were continued. Data from the last three census reports have been analyzed, and changes in the relative importance of the different crops and classes of livestock in the different counties have been mapped for the entire United States. These maps provide an accurate picture of the changes in the agriculture of the different areas and are of fundamental use in determining systems of farming which are best adapted to the physical and economic conditions prevailing in each area.

Detailed analyses of types of farming were conducted during the past year in cooperation with eight State agricultural colleges and experiment stations. These studies were completed in South Dakota and Kansas, and similar studies are nearing com-

pletion in Michigan, Texas, Minnesota, Indiana, and Nebraska. These detailed studies are particularly helpful in supplying agricultural workers with definite knowledge upon which to base programs for improvement. In North Dakota, Oklahoma, South Dakota, and Kansas, where the studies have been completed, the results were used to good advantage last year in interpreting the national outlook to local extension workers and to farmers in terms of the conditions prevailing in the different localities in each State.

THE APPLE INDUSTRY

Particular attention was given to a study of the present status and future outlook for the apple industry. Tree plantings and removals of different varieties and prices received for the different varieties, grades, and sizes in the major apple-growing districts were studied.

Bulletins were issued in cooperation with the Utah and Arkansas agricultural experiment stations which contained information on the cost of producing apples with particular reference to the different varieties. They pointed out means whereby profitable adjustments might be made in the farming systems of the apple areas studied. Bulletins on the factors affecting the price of apples were prepared in cooperation with the agricultural experiment stations of Oregon and Idaho. These publications pointed out the importance of producing certain varieties and of certain grading and sizing practices from the standpoint of increasing the farmers' returns. Similar studies are being made in Washington and in the Cumberland-Shenandoah area of Pennsylvania, Virginia, and West Virginia in cooperation with the State experiment stations.

RETURNS TO STRAWBERRY GROWERS

Study of the factors which affect returns at New York City to strawberry growers was continued in cooperation with the Arkansas Agricultural Experiment Station. Annual, weekly, and daily supplies in New York are being analyzed for the purpose of showing the quantities of strawberries that New York City will take at various prices. Variations in the prices of berries from the different producing centers are being studied, and New York City's preference for berries from the different parts of the country as determined by the prices paid

is being considered. This study will yield facts of value to southern and eastern strawberry growers. A study was undertaken in cooperation with 10 Southern and Eastern States to determine the place of strawberries in the organization of the farm and the principal factors which affect the returns received by strawberry growers. Particular attention is being given to the practices and costs of producing strawberries in the various competing districts and to determining the possibilities of adjusting production to demand.

THE EASTERN GRAPE SITUATION

For some years past conditions in the grape industry of the United States have been unsatisfactory. As a result of low returns to eastern grape producers, this bureau, in cooperation with the agricultural experiment stations of Missouri, New York, Michigan, and Pennsylvania, undertook an economic study for the purpose of providing a basis upon which eastern grape producers may make plans for the future constructive development of the industry.

This project includes an analysis of the present condition of vineyards, recent plantings, removals, and care now being given to the vines. Details of operations, such as soil building, spraying, pruning, thinning, grading, packing, and disposal of grapes with final reference to quality, costs, and prices are being studied. The farm-management work will be coordinated with the results of investigations by the bureau of the consumption and marketing of grapes. The final aim of the research is to indicate how the eastern grape farmers may improve their farm organization, production, and marketing practices, and how better to adjust their production to market requirements.

THE PECAN INDUSTRY

At the request of the National Pecan Growers Association a study of the pecan industry was undertaken in cooperation with State agricultural colleges and experiment stations. Information was obtained relative to the labor, power, materials, and equipment used in production, the cost of the various elements of production, and the price received for varieties and grades of pecans sold by different methods. The results of this investigation will be presented in printed form with results of other phases of the study now being made by other divisions of the

bureau of the future trends of production and of marketing practices. The final aim is to determine and to interpret the national economic factors that affect the pecan industry in each of the various areas so that the growers may have a better understanding of the future of the industry and of the practicability of effecting economies in order to meet future conditions.

INFLUENCE OF WINTER LEGUMES ON CROP PRODUCTION

In cooperation with the Bureau of Plant Industry a study was made in Georgia, Alabama, South Carolina, and North Carolina to determine the extent to which farmers are using winter legumes in their system of farming and the economic benefits derived from this use. The study indicates that where these crops are plowed down for corn the yield of corn is increased from 5 to 30 bushels per acre in average seasons. Exceptions were found when the stand of corn was poor or when the winter legume did not make a satisfactory growth. Indications are that the results of plowing down legumes for cotton are not as uniformly good as for corn; yet there were numerous cases in which the results were excellent.

The time and manner of sowing the legume seed, the inoculation of the seed or soil, the use of fertilizer, the time of plowing down the legumes, the date of planting the subsequent crop, and the time elapsing between plowing and planting affect the returns from the following crop. The results of this study have a particular significance in studies of profitable systems of farming.

ECONOMICS OF HAY PRODUCTION

Steady decline in the number of hay-consuming animals on farms and replacement of draft and driving animals with automobiles and trucks in cities has resulted in a decreased demand and price for hay. This condition makes it essential that producers of market hay seek means of reducing their production costs. With the view of aiding hay producers in reducing their costs a set of lantern slides entitled "Equipment and Practices that Reduce Costs in Hay Making," together with explanatory notes, was prepared for the use of extension workers in sections in which the production of hay for market is an important enterprise. This series consists of 62 slides illustrating the

latest labor-saving hay-making equipment and practices. Farmers' Bulletin 1615, entitled "Hay Stackers and Their Use" was submitted and is now in press. This bulletin presents all essential information on the use of the various makes of hay stackers, and is of especial value to farmers in the East and South, where most of the hay stacking is done by hand.

SWEETCLOVER IN THE CORN BELT

An economic study of the production and utilization of sweetclover on Corn Belt farms was undertaken in cooperation with the Bureau of Plant Industry and the experiment stations and agricultural colleges of several Corn Belt States. Sweetclover is rapidly becoming one of the most important leguminous crops in the Corn Belt. It is important for soil improvement, for pasture, and, under certain conditions, for a hay crop. As the European corn borer continues to spread, sweetclover is likely to play a more important part in the systems of farming of the Corn Belt. Results of this study will be useful in determining how and to what extent sweetclover may be used in making adjustments in the farm organizations on farms on which the corn borer becomes destructive.

BROOMCORN PRODUCTION

In cooperation with the Bureau of Plant Industry and the agricultural colleges and experiment stations in the States of Illinois, Oklahoma, and Kansas a study was undertaken to determine the present condition and future outlook for the broomcorn industry. The Bureau of Plant Industry paid particular attention to the agonomic phases of broomcorn production, and this bureau considered the economic aspects. Demand for broomcorn brush is limited. When production is light prices are good and the growers make money, but the industry is easily overexpanded.

Each of the principal broomcorn areas can shift from broomcorn to other cash crops without great difficulty; therefore, one of the main objectives of the farm-management study is to determine the place of broomcorn in the system of farming in each of the important districts under different price conditions. This involves a study of production costs and practices, influence of variety and quality of broomcorn brush on price, and comparison with similar data regarding other crops.

SYSTEMS OF HOG PRODUCTION ON CORN-BELT FARMS

The study of the economics of pork production on Corn Belt farms was continued. Particular attention was given to the place for the different systems of pork production in different parts of the Corn Belt as determined by the size of farm, quantity of corn produced, climatic conditions, and other crops and livestock in the farm organization. Changes that occur in the production program when hogs are low in price and when they are high in price were given attention. The final aim of this study is to determine the best systems of hog production in the different type of farming areas of the Corn Belt States and the variation that can be made in each to meet prospective changes in hog prices.

BEEF-CATTLE PRODUCTION IN WEST VIRGINIA AND SOUTHWESTERN VIRGINIA

Profitable utilization of grass is the main problem of farmers in the cattle-producing districts of Virginia and West Virginia. Beef cattle still offer the best means for converting this grass into money, although dairying is gaining headway in several parts of the area. One problem here is a revision of production methods to meet more nearly the changes in consumer demand that have taken place in recent years. This study involves the bringing together and interpretation of experimental and other data for the purpose of indicating desirable systems of beef-cattle production and farm organization for different parts of the area.

RANGE-CATTLE PRODUCTION

Studies in the important range-cattle producing areas were continued in cooperation with the Bureau of Animal Industry and the State experiment stations and extension service. As these studies are concluded in a given district, definite methods of range-cattle production and ranch organization are worked out for each part of the district covered. Recommendations are made as to changes that ranchmen operating under different sets of conditions may make to increase their returns. Plans have been made to carry this material and the outlook material on beef cattle, including the probable demand for feeder cattle, back to the ranchmen in these districts in a way that will help them to reorganize their business.

HOG PRODUCTION IN PEANUT DISTRICTS OF ALABAMA AND GEORGIA

The study of hog production is an outgrowth of the study of livestock possibilities in the southeastern coastal plains, the results of which have been recently published in Technical Bulletin 127. For the area as a whole the lack of good native pastures limits the extensive production of cattle and sheep. An exception is found in the black prairie belt of Alabama and Mississippi, where excellent pastures can be developed. Farmers' Bulletin 1546 treats in detail the systems of farming which offer good opportunities in this district.

The outstanding district for hog production is located in southeastern Alabama and southwestern Georgia, where peanuts do well. Profitable hog production in this district depends to a large extent on carrying hogs economically on grazing crops during the summer until the peanuts are ready for hogging in the fall. The system of grazing and, to some extent, the system of finishing depends upon size of farm, other crops grown, labor supply available, etc. Plans for this district are being worked out showing definite systems of hog production to fit these conditions and the farm organizations that seem likely to give the greatest return during the next few years.

TREND OF POULTRY INDUSTRY

Effort has been made to bring together and to analyze the economic information available in the department on the factors which affect the economic welfare of the poultry industry. A report has been prepared consisting largely of maps, graphs, and tables, with explanatory text which deals specifically with factors affecting the long-time and the short-time changes in egg prices, the cause and significance of price differences as between various grades of eggs, and the economic and other factors that have contributed to the marked changes in egg production and marketing since the World War. This report will be of unusual interest to commercial poultrymen and will serve as an excellent basis for Federal and State economic studies of poultry farming.

ECONOMICS OF BEEKEEPING

Study of apiary operation and management was continued during the year in cooperation with the Bureau of Entomology. Detailed records of

labor used, expenses, and production were kept by 40 commercial beekeepers in the intermountain States. Conditions for honey production were variable in 1928, and although some apiaries were profitable, returns from others were very unsatisfactory.

The study indicates that the relation of practices to yield per colony is the most important single factor affecting earnings of the operator. Large apiaries usually have more complete equipment and make better use of the labor actually spent in caring for bees and honey. Yet the wide distribution of bee yards necessary to handling a large number of colonies requires much time for transportation expenses, which tends to limit the size of one business unit. Indications are that many of the economies of operation and management are applicable to apiaries of different sizes.

THE COMBINED HARVESTER-THRESHER

The study of small-grain harvesting and threshing methods, and particularly of the combine method, begun in the Great Plains States in 1926 and continued in the Corn Belt and Eastern States in 1927, was extended to include North Dakota and Minnesota in 1928. The work was done in cooperation with the Bureaus of Plant Industry and Public Roads, the agricultural experiment stations, and the Grain Division of this bureau.

The work was especially valuable in that it included a study of the newly developed windrow and pick-up attachment for combines in an area where, because of weeds and the uneven ripening of grain, straight combining does not always prove satisfactory. Information obtained shows that in straight combining, 5 to 10 days should elapse after a crop is ready to bind before harvesting with the combine begins, but the 1928 study showed that, by using the windrow method, harvesting can begin as early as when the binder is used. It was determined that the cost of windrowing is somewhat higher than the cost of straight combining, but that the loss of grain is less. With the publication of the data obtained in 1928, which are now in manuscript form, all of the results of these different studies will be available to grain growers in printed form.

EUROPEAN CORN BORER

The continued advance of the European corn borer into the major corn-producing area makes it necessary for

farmers in that area to consider adjustments in the present farm organization to meet the situation effectively when the corn borer becomes destructive. A study was inaugurated during the year in cooperation with the Indiana Agricultural Experiment Station to determine the most successful systems of farm organization and management. The extent to which different methods of cornstalk utilization and disposal are now being practiced under varying sets of conditions will be determined. Changes in crop rotations, livestock combinations, and types of equipment are being considered, as well as farm practices that will utilize cornstalks in ways that will give greater financial returns, economically conserve soil fertility, and most effectively control the European corn borer.

A study was undertaken for the purpose of ascertaining the possibility of substituting other crops for part of the corn acreage. Effort was made to determine the present outlook for such crops as sugar beets, canning crops, tobacco, and others which might be substituted for corn, and to determine the relative profitability of producing these crops in comparison with corn under corn-borer conditions. It is important to determine the extent to which farmers can afford to increase their cost of corn production by control measures and continue to grow corn in preference to other possible substitute crops. The problem is not the same in the different districts of the Corn Belt States. The problem of corn-borer control varies in intensity as the acreage of corn produced per farm varies. Thus, in certain parts of the Corn Belt most of the corn acreage grown per farm is required for the silos, and under those conditions the clean-up problem is of minimum importance. In other districts the corn acreage per farm is large, and much of the corn is husked from standing stalks. It is in such districts that the farm-management problems under corn-borer conditions are most important.

FARM RECORDS AND ACCOUNTS

Studies of farm organization and management by means of detailed farm records were conducted in cooperation with the State colleges of agriculture and experiment stations of 12 States in selected farming areas. Data are obtained from daily records showing the amounts of man labor, horse work, fertilizer, and other factors used in

crop production and the amounts of man labor, horse work, feeds, and other factors used for the production of livestock. The records also show the financial progress of the farm as a whole. Data from these studies show how successful farmers have worked out profitable practices, and indicate the causes for failure on unprofitable farms. The data, with supplementary information on local prices, crop yields, and trends of production, are used in outlining systems of farming that seem to offer the best opportunities for profits under conditions generally found in the area.

A bulletin was published in Texas showing probable returns from different systems of farming in the black waxy prairie belt of Texas. This bulletin points out the extent to which livestock may be profitably included in the system of farming. Bulletins reporting the results of a study in the Jackson Purchase area of Kentucky form the basis for an extension program to promote better systems of farming in a section where tobacco is being replaced by other enterprises. In Iowa a series of bulletins reporting the findings of a completed study on profitable systems of farming is in preparation.

COST OF PRODUCING STAPLE CROPS

Cost-of-production studies of corn, wheat, oats, and cotton, were continued. Reports from farmers located in many parts of the country were analyzed and the results published. This project is continued from year to year for the purpose of making available data which will indicate general changes from year to year in production costs. For the farms reporting, the 1928 corn-production costs averaged 3 cents per bushel more than did the costs of the previous two years. The 1928 cost of producing wheat averaged 6 cents per bushel more than the average cost in 1927. Production costs of oats were generally less in 1928 than for the previous year. Cotton-production costs tended to be only slightly more in 1928 than they were in 1927.

FARM RETURNS

A study of statements submitted by voluntary reporters of the financial results of their own farms for 1928 yielded the following information: The average return of \$1,334 shown by 11,851 owner operators for 1928 was higher than in any of the years

1922-1927, in which farmers from the same general list have reported their returns. The return of \$1,334 per farm in 1928 was made by farms averaging 284 acres in size, representing an investment of \$15,417 at values current on January 1, 1928, and consisted of \$1,090 excess of cash receipts over cash outlay for current operating expenses and an increase of \$244 in the inventory of crops, livestock, machinery, and farm supplies.

The farm family had food produced and consumed on the farm, the estimated value of which on the farms reporting the item was \$269, and fuel and house rent, the values of which were not reported. Interest averaging \$202 paid on indebtedness and outlays for improvements averaging \$126 were not included in the computation of current cash operating expenses.

Improvement in average returns in 1928 as compared with returns from the farms reporting in 1927 was shown for the three central geographical divisions. In the western division the average difference between cash receipts and cash outlay for current operating expenses was larger than in 1928, but inventory increases were much smaller; in the North Atlantic and South Atlantic divisions the returns were materially smaller than those reported for 1927. Sixty-five percent of the reports for 1928 showed returns less than the average, \$1,334; half the reports showed more than \$891, and half showed less. Slightly less than 9 per cent of those reporting showed net losses from operations in 1928, as compared with 14 per cent in 1922 and 10 per cent in 1925, the best previous year of the period covered by these reports. About three-fifths of the returns have fallen each year in a group ranging from 0 to \$1,499; the largest single group has been that ranging from 0 to \$499.

LARGE-SCALE FARMING

A study of large-scale farming has been conducted in the Corn Belt States for the purpose of determining the outstanding advantages and disadvantages of large-scale farming when operated from one central unit and with hired labor exclusively. The study indicates that the importance of the management factor upon the success or failure of a large-scale farming organization can scarcely be overestimated. Although there are indications that large-scale operations have advantages in efficiency of operation, some of the economies often claimed for large-scale

farming can be obtained on smaller farms with proper management.

One of the characteristics of the large-scale farming organization is the tendency toward a high degree of specialization. Examples of specialization and coordination of farming with other business are a hog farm operated in connection with a packing plant; a farm producing green produce for a canning factory; and large-scale feeding operations in connection with by-products from canning factories.

A part of the growth in large-scale farming has been the result of large numbers of farms coming into the hands of banks and insurance companies during the agricultural depression. A part has come about as a result of the formation of large-scale farming organizations for the purpose of commercializing agricultural production. Various methods have been used in organizing units for large-scale operations. Plans are being laid for a reconnaissance study of the entire field of large-scale farming.

FARMING IN THE APPALACHIAN HILL LANDS

Much of the farm land of the Appalachian Plateau area is rough and broken and is not productive. Farming is carried on under adverse conditions, and the incomes are comparatively low. Thousands of families live on such farms and are making a meager living, either from the farm alone or from the farm and employment off the farm. In cooperation with the State agricultural experiment stations, studies are being made of the farming in Appalachian Plateau districts of North Carolina, Kentucky, and Tennessee that the more profitable systems of farming may be brought to light.

FARM BUDGETING

Studies were continued in cooperation with State colleges of agriculture in Kentucky, North Carolina, North Dakota, and Minnesota in which definite farm plans for the coming year are worked out with farmers. Accounts kept by farmers during the previous year are analyzed, and suggestions are made for the improvement of the next year's operations. Adjustments are suggested, when the outlook for a particular product indicates that the farmer can adjust his system of farming with good chance for success.

The farm plans are the result of budgets carefully worked out and compared. The results of each year's op-

erations are then compared with the results that would have been obtained through various modifications of the year's business, as shown by the budget statements. In this way data are obtained which are used as a basis for modifying conclusions from records formerly obtained and for testing the soundness and practicability of the suggestions.

REORGANIZATION OF FARMS

The development of more profitable farm organizations for farmers in the dark-tobacco belt of Virginia was continued in cooperation with the Virginia extension service. Changes made in the farming systems as a result of recommendations made by the department have resulted in increasing the farmer's earnings. Thus, in 1927, the farmers who followed the recommended changes in their farm organizations averaged \$1,158, as compared with \$773 in 1922, an increase of about 50 per cent. On each of the farms included in the organization study the 1927 earnings were higher than the 1922 earnings, although tobacco prices declined more than 40 per cent during the period.

In general, these farms have been reorganized so that tobacco plays a less important rôle in the farmers' incomes. This change was made necessary because of lower prices for certain types of tobacco. The farmers who changed their plans to meet the situation have increased their livestock, especially poultry, hogs, and dairy cows. They have only their best lands for tobacco, and thereby improve the quality of the crop. The major part of their increased earnings has come through the expansion of other enterprises.

In cooperation with the State agricultural experiment stations, organization studies were made in Cache County, Utah, Salt River Valley, Ariz., and in the Elephant Butte project of New Mexico. These surveys, together with information from other sources, served as a basis for indicating incomes that can reasonably be expected from different organizations.

This information was placed before the farmers by means of economic conferences in each territory at which committees of farmers met with a representative of the agricultural college to consider the available facts. On the basis of these facts recommendations were drawn up by each committee as to the desirability of increasing or de-

creasing the acreage devoted to each of the various commodities in question and as to the best production practices known.

Careful consideration was given to the results of the farm-management survey, the farm budgets which had been prepared on the basis of these surveys, and the information available regarding the outlook for the products raised in the territory. The farmer members of the committees freely gave their judgments on the practicability of the plans presented. After making some changes in them the committees offered definite recommendations as to the farm organizations and practices which seemed best suited for a satisfactory standard of living on different-sized farms under the price relationships that are likely to prevail during the next few years.

A summary of the results of the Cache County economic conference was published by the Utah Agricultural College. Detailed manuscripts have been prepared which give the results of the surveys and conferences held on the Salt River Valley and the Elephant Butte projects. In the wheat-farming area of eastern Washington and northern Idaho, a study of profitable farm organizations is now under way in cooperation with the Washington and Idaho Agricultural Experiment Stations.

In the low hills in southwest Arkansas a study of farm organization, carried on in cooperation with the University of Arkansas, is nearing completion. This study shows that the most profitable farm organization in this locality is the one which is built around cotton as the major enterprise, with the fullest utilization of the time of the farmer and his help coupled with efficient methods of production.

LOCAL APPLICATION OF OUTLOOK INFORMATION

Continued effort was given to the use of outlook information in determining short-time and long-time adjustments which farmers could profitably make in their farming plans. The outlook reports issued by the bureau have been interpreted in terms of State and local problems in order that the information might be directly applicable under different conditions prevailing in different parts of the country. The localization of the national outlook information has been carried on in direct cooperation with State and local agencies. The bureau has been active in cooperating with these vari-

ous agencies in placing the localized information before groups of farmers through annual or semiannual outlook meetings. The work has been well received, and much interest has been displayed in the information presented and in the significance attached to the outlook work.

DIVISION OF CROP AND LIVESTOCK ESTIMATES

W. F. CALLANDER, *in charge*

One of the most important developments in the Division of Crop and Livestock Estimates has been the expansion of research work and the practical application of the results, (1) to the better handling of sample data used in the determination of acreage changes and numbers of livestock, and (2) to forecasting crop yields from weather data, as well as from condition and other factors. The quality of many of the reports issued has been materially improved as a result of the research work.

Rapid progress has been made in the field of statistical research as applied to crop-forecasting problems. This research has been under way only a relatively short time, but it is already resulting in greater accuracy in the estimates and forecasts and in a higher degree of efficiency in the handling of the necessary data. Research has been developed along two well-defined lines. The first covers the problems involved in obtaining basic data and making estimates therefrom, which may be termed sampling in the broadest sense of the word. As sample data form the bases of practically all the estimates and reports, it was found essential that all of the technical workers should have a thorough knowledge of sampling theory and practice as it applies to the many sampling activities of the division. Through a series of special conferences, extending over three years, practically all of these workers, both in Washington and in the field, have received special instruction in statistical methods and the application of these methods to crop-forecasting problems.

The second field of research deals with the problems of measuring fundamental relationships such as exist between weather and crop yields over a series of years; or economic factors on the one hand and changes in acreage or production of livestock and livestock products on the other; and the use of these relationships as a basis

for forecasting agricultural production. Objective methods are being developed to supplement the present methods of forecasting, which are largely subjective in character. Already some interesting studies have been made. In New England, for example, the field statistician found remarkably close relationship between June and July rainfall and the yield of potatoes and has developed a forecasting formula which was used last year with gratifying results.

Practically all of the reports issued covering crop acreages and numbers of livestock are based on reports from individual farmers, each of whom reports for his own farm. The introduction of the use of these individual-farm questionnaires in place of the judgment or opinion inquiries which had been in use since 1866 has been a long step toward increased accuracy both in estimating crop acreages and in estimating numbers of livestock.

Individual-farm questionnaires are sent out several times a year. The first set of schedules is mailed out in March and calls for information concerning the farmers' intention to plant spring crops. These schedules include questions as to the acreage of various crops grown the previous year and the acreage they intend to plant for the current year, from which the change is calculated. Nearly 250,000 schedules of this kind were sent out. In June another similar questionnaire is sent out to about the same number of farmers asking for the acreage in various crops for the previous year and the acreage planted in the current year. This questionnaire affords the principal basis for the preliminary estimates of acreage planted, which is issued in July. In September nearly 1,000,000 cards are distributed through the rural carriers, on which the farmers are asked to report the acreage for the current year only. These cards constitute the principal source of information for the December estimate of acreage harvested.

In addition to the individual-acreage inquiries, two individual farm inquiries are made concerning livestock, through the rural carriers, one in June and one in December, and one questionnaire is sent out by mail in January. The June inquiry covers swine and sheep; the December inquiry covers all classes of livestock.

It has been found that the data secured from the individual farm questionnaires can best be handled in the field offices by statisticians who

are familiar with local conditions. For this reason the handling of all of the inquiries relating to acreage and livestock numbers has been turned over to the field offices. The interpretation of the data is now made largely in the field offices by the statisticians in charge, in conference with statisticians from the Washington staff. Each field office is visited by a member of the crop-reporting board at least twice a year, once in June to review the preliminary estimates of acreage issued early in July, and again in November, to review the results of the fall acreage survey made through the rural carriers. A number of offices are also visited in January in connection with the livestock surveys.

The research done so far has shown some of the limitations of the individual-farm sample material and is pointing the way to the best methods of handling the returns. The data are being handled in three ways: (1) In making direct comparisons between the acreages or numbers of livestock reported currently for both present acreages or numbers and for the previous year; (2) in making comparisons of the ratios of acreages or numbers of livestock to total farm or crop acreage as reported currently with similar ratios of the previous year (large samples are used but they do not necessarily include identical farms for both years); and (3) in making direct comparisons between identical farms for the present and the previous year.

Because of the highly selective nature of the individual-farm returns, many problems of bias arise. The development of methods of measuring bias has involved much research.

The application of the theory of sampling to these three comparisons has thrown light on the question of how large a sample is needed in order to obtain a desired degree of precision in the results. The studies so far completed show very clearly that in the direct comparison of the acreage of a given crop for two years on the identical farm, a very much smaller sample will result in the same degree of precision as will a larger sample when the ratios of the acreage of a given crop to the total farm acreage from different farms are compared for the two years. Many other discoveries have been made which are being incorporated in the methods used in handling sample data both in Washington and in field offices.

A number of fundamental questions remain unanswered, such as the measure of the increase in the precision of the results when the crop correspondents are distributed by township over results obtained when the reports are obtained by random selection, and the effect of different degrees of stratification of the sample, etc. Work on these problems will be continued. In the field of measuring fundamental relationships between economic and other environmental factors and the change in acreage from year to year or in crop yields per acre, enough has already been done and the results have been sufficiently valuable to warrant immediate expansion of this type of research.

OUTLOOK STUDIES

Attention has been given to gathering additional data for use in preparing the bureau's Outlook Reports. Questionnaires have been distributed and the data obtained have been tabulated, analyzed, and used, in connection with information available in other divisions of the bureau, in the making of the report on the outlook for the major farm crops. One representative is giving a large part of his time to supplying information to organizations which are working toward the stabilization of the livestock industry.

Field studies were made covering the age and variety of pecan and peach trees. The field work was practically completed by July 1, and the questionnaires, many of which were gathered by farm-to-farm visits, are now being tabulated. Reports will be made in cooperation with other divisions of the bureau.

A special study was undertaken in the Hood River apple district in Oregon to determine the factors affecting the size of apples with a view to developing a method of forecasting in August of each year the sizes of the apples in the forthcoming crop. The study was brought to a successful conclusion by the end of the year, and the results will be used during the current year by the cooperative apple association in the valley in making their sales contracts.

FARM PRODUCTION AND INCOME

A great deal of time has been devoted to estimating by States the gross income of farmers. These studies have included estimates of the production, utilization, and value of meat animals, milk, poultry, eggs, and

honey, as well as of most of the crops grown. A large number of questionnaires concerning the utilization and disposition of farm crops were sent out, the results of which were used in estimating farm income.

COOPERATION WITH STATE AGENCIES

Cooperation with the State of Georgia was discontinued on October 1, 1928, and the work in that State is now conducted independently of any State agency. In all of the other 32 States where cooperative agreements are in effect, the relationships have been continued, and in some the scope of the work has been enlarged by increased State contributions. State cooperative agencies are now contributing total funds in excess of \$200,000 a year to the crop-reporting work.

PRICE REPORTS

The price-reporting work, including the monthly reports on prices received by farmers for the more important products grown on the farm, and the quarterly reports on a large number of products bought by farmers, is being steadily improved through expansion of the list of reporters as well as by the development of better technic in the handling of the data.

During the coming year the division will have the task of furnishing to the Bureau of the Census county farm prices on most of the commodities to be covered by the agricultural census to be taken next spring. Work is already under way on this project, as many of the truck and fruit crops which will be included in next spring's schedule have already been marketed. Many of the prices on special crops grown in localized areas will be obtained by the State statisticians through field travel. The prices ascertained by the bureau will be used by the census office in ascertaining the values of the various crops produced in 1929 and the inventory values of livestock on farms on April 1, 1930. The prices will be weighted by monthly sales wherever possible in order to arrive at accurate values of each of the crops and livestock products like milk and eggs. Under an arrangement with the Census Bureau, sufficient technical and clerical assistance will be provided by that bureau to carry out this project.

MILK STATISTICS

Although milk and its products constitute a large and increasing proportion of the total food supply of the

country and contribute nearly \$2,000,000 per year to the gross income of farmers, there have never been adequate statistics on the production and use of milk in the various States. This has made it difficult for producers to analyze current trends correctly and to calculate future production and prices. It has also handicapped the department's workers in reaching sound conclusions regarding prospective changes in food production, agricultural efficiency, and returns. To provide a foundation for statistics on monthly and yearly milk production whenever facilities for such estimates might become available, the Division of Crop and Livestock Estimates has, for the past five years, collected reports from crop correspondents on the number of milk cows in their herds on the first day of each month, the number of these cows milked, and the quantity of milk produced. Recently some additional information has been collected regarding the age at which the heifers freshen, the disposition of the milk produced, and the butterfat test.

For each State preliminary calculations have been made of the number of milk cows of milking age, production of milk and butterfat per cow, number of calves to which whole milk was fed, and the quantity of whole milk thus utilized, the quantity of milk used for domestic consumption and butter production on the farms, and the quantity of milk sold from the farms. The calculations cover the years 1924 to 1928, inclusive. Present indications are that satisfactory statistical methods can be developed and that annual estimates of the milk production and consumption in each State can be made a part of the regular program of the division.

POULTRY STATISTICS

Poultry and poultry products make up an important item of farm production and, as is the case with milk, the available statistics relating to the production and use of these products are meager and unsatisfactory. During the last year an effort has been made to bring together all available information that might throw some light on the industry. As a result of this work, tentative estimates of the production of chickens and eggs by States have been made. For the last four years the division has carried two or three questions on poultry in the regular monthly schedules which have been helpful in ascertaining trends.

ENLARGED PROGRAM FOR TRUCK AND CANNING CROPS

During the World War, when emergency appropriations were made, the crop reports relating to fruit and truck crops were greatly expanded. At the close of the war these special funds were discontinued, and it was necessary greatly to reduce the scope of the reports. The major fruit crops more generally grown in the United States and a few of the fruit crops of a semi-tropical nature have been covered rather fully in the regular monthly reports of the bureau, but the reports covering most of the truck and canning crops had to be greatly reduced in scope.

Beginning with the fiscal year, July 1, 1929, an appropriation of \$50,000 became available for expanding the fruit, truck, and canning crop reporting work. Considerable reorganization work was done toward the close of the last fiscal year in order to be in position to inaugurate a service on July 1 that would be satisfactory to the fruit, truck, and canning interests. In the development of this program the country has been divided into a number of districts with a fruit and truck crop statistician assigned to each district. For example, one statistician has been assigned to the Pacific Northwest, and another to the district comprising the States of Indiana, Ohio, and Michigan. The duties of these men are to keep in touch with the situation in their respective districts, especially with respect to the truck and canning crops, to make reports direct to Washington, and to assist the State statistician in collecting information for the monthly reports on the major fruits. Already a marked improvement has been made in the quality and scope of the reports, and they are meeting with the general approval of the interests most concerned.

DIVISION OF COTTON MARKETING

ARTHUR W. PALMER, *in charge*

The work of the Division of Cotton Marketing embraces service, regulatory, and research activities. It is carried on under authority of the following statutes: The United States cotton futures act, August 11, 1916, as amended; the United States cotton standards act of March 4, 1923; the act of March 3, 1927, authorizing the Secretary of Agriculture to collect and publish statistics of the grade and staple length of cotton; and the act of April 12, 1928, relating to investigation of new uses of cotton.

ENFORCEMENT OF UNITED STATES COTTON FUTURES ACT AND UNITED STATES COTTON STANDARDS ACT

In the general enforcement work a number of amendments to regulations under both the cotton futures act and the cotton standards act have been prepared, and a revised edition of the regulations under the last-mentioned statute has been published.

MILLIMETER DESCRIPTIONS

In June, 1928, the solicitor gave out an opinion in which he held that under present usage millimeter description as applied to cotton which is of, or within, the lengths embraced in the official staple standards is contrary to the cotton standards act. As soon as the new requirements became generally known and understood the official cotton standards of the United States for length of staple became the basis of the interstate and export trade in cotton, and the leading cotton exchanges of Europe, with the exception of Liverpool, which now has this under advisement, provided facilities for arbitration based upon the official staple types. The disposition of the trade in the United States to comply with the requirements has been apparent, and the investigation of the few complaints of continued sale on millimeter descriptions disclosed no willful violation in any case. Another important development has been the cooperative arrangement effected between the American shippers and various of the European organizations for representation on appeal arbitration committees abroad, a plan which has functioned very satisfactorily to buyers and sellers alike.

SOUTHERN DELIVERY ON FUTURES CONTRACTS OF THE NEW YORK COTTON EXCHANGE

On November 16, 1928, the New York Cotton Exchange amended its by-laws so as to provide that cotton tendered in settlement of its contracts under section 5 of the United States cotton futures act shall be "deliverable from licensed warehouses in the ports of New York, Norfolk, Charleston, Galveston, Houston, or New Orleans

* * *." Trading in the new form of contract, which thus made provision for delivery at southern ports, began on January 2, 1929, and the first delivery month under the new contracts is October, 1929. This will necessitate the establishment of boards of cotton examiners at Charleston and Norfolk.

UNIVERSAL COTTON STANDARDS CONFERENCE

The third Biennial Universal Standards Conference provided for in the agreements between the United States Department of Agriculture and the nine leading cotton exchanges and associations of Europe was held in Washington in March, 1929, for the purpose of approving copies of the universal standards for American cotton for use by the department and by the European organizations. Sixty-five full sets of copies of the universal standards—a total of 1,300 boxes—were approved.

Consideration was given to the question of including standards for spotted and tinged cotton and for long-staple cotton under the universal-standards agreements, but no definite agreement was reached.

PREPARATION AND DISTRIBUTION OF OFFICIAL COTTON STANDARDS

The Universal Cotton Standards Conference and the revision of various standards placed an unusually heavy burden upon the division, but all this work was handled with very satisfactory results. During the year 3,892 boxes of the standards for grade and color and 17,195 staple types were distributed, as compared with 4,625 boxes and 10,762 staple types during the fiscal year 1928. The sum of \$28,917.25 was collected from these sales of practical forms and \$23,955.30 from sales of loose and rejected cotton. A total of 368 bales of cotton was purchased for the preparation of the practical forms at a cost of \$46,396.04.

Orders promulgating revised standards for American Egyptian cotton and for extra white cotton were signed by the Secretary on April 10, 1929, to become effective August 1, 1930. These standards were presented in tentative form to representatives of organizations of farmers, merchants, and others who were in attendance at the Universal Standards Conference of 1929, and these representatives unanimously approved the revisions.

CLASSIFICATION OF COTTON

The cotton futures act provides that all cotton intended for delivery on future contracts shall be classified by officers of the department. Boards of cotton examiners are maintained in New York, New Orleans, Houston, and Galveston and an appeal board in

Washington. Plans are under way to provide for boards of examiners in Norfolk and Charleston to meet the requirements of southern delivery on future contracts on the New York Cotton Exchange.

There was a marked increase during the year in the demand upon the various boards for classification service. The number of bales classified was 446,181 (not including reviews), as against 137,695 during the fiscal year 1928. Collections during the year amounted to \$200,724.61 and disbursements to \$167,428.55. Of the total collections, \$8,469.58 was for sale of loose cotton and the balance for classification fees. A balance of \$152,550.96 was in the Treasury on July 1, 1929, for conducting the work of this project for the fiscal year 1930.

The cotton standards act makes available the classification services of the various boards of cotton examiners to all persons requesting such service at a cost of 40 cents for the determination of the grade and staple length, and character if desired, for each sample submitted. Classification as to any single factor of quality may be had for 20 cents per sample. In all, 35,946 bales were classed under this act.

DEMONSTRATIONS OF STANDARDS AND COTTON CLASSING

For a period of three months demonstration work in the classification of cotton according to the official standards was carried on at Columbia, S. C. Farmers and others were invited to submit samples for informal classification and were furnished, without charge, a memorandum showing the grade and staple length of each sample. This work attracted much interest and favorable comment, and almost 5,000 samples were submitted for classification.

The bureau has cooperated in conducting six schools at which qualified cotton specialists demonstrated the universal grade standards and the standard forms for official staple lengths. The demonstration of the universal cotton standards for grade and the official staple forms for staple length in European markets has been continued with very satisfactory results. The bureau's representative has been very helpful in obtaining the co-operation of European merchants in the effort to have American cotton sold throughout the world on the present staple forms expressed in inches instead of on a millimeter description.

Arrangements have been made for the foreign representative to demonstrate the universal grade standards and the official forms for staple length at the Exposition of Modern Trade to be held during August and September in Brno, Czechoslovakia.

SPOT COTTON MARKET SUPERVISION AND COTTON MARKET NEWS AND QUOTATION SERVICE

The lines of work embraced under this heading are (1) the supervision of the quotation of commercial differences by the spot-cotton markets which have been officially designated as such for the purposes of the United States cotton futures act, and (2) the cotton market news and quotation service.

Effective in March, 1929, the rules of the New York Cotton Exchange were amended to provide for future contract deliveries of cotton fifteen-sixteenths and 1 inch in length of staple at premiums above cottons of seven-eighths inch, the minimum length tenderable under the law. Premiums for these lengths are provided for by the New Orleans Cotton Exchange and the Chicago Board of Trade. Particular attention has, therefore, been given to the quotation of staple premiums in those designated spot markets wherein such premiums are regularly quoted. Continued close supervision has been maintained over the quotation of commercial differences applicable to various tenderable grades, and the 10 designated spot markets have been regularly visited and canvassed each month. A high degree of accuracy in these quotations has been maintained throughout the year, and practically no complaints from either deliverers or receivers on future contracts have been received.

The market news service has given particular attention to the interrelationships among the cotton markets of the world, and the world market conditions have been comprehensively visualized. Telegraphic reports were received frequently each week from many domestic cotton centers and weekly cable reports from cotton centers in England, Germany, France, and Italy. These reports contained up-to-the-hour information on the state of the demand for various grades and staples of cotton; qualities in supply and qualities sought; basis prices, grade differences and staple premiums, fixations, and other factors of cotton marketing information. The data thus as-

sembled in Washington were carefully reviewed; then the more vital features were consolidated into a weekly review, which was telegraphed (by leased wire where available) each week to field offices for wide dissemination. In addition, there was prepared at branch offices a premium staple report which covered the prevailing premiums for cottons above seven-eighths inch, including lengths from fifteen-sixteenths up to $1\frac{5}{16}$ inches. Newspapers and periodicals were especially active in publishing the information assembled, and in this way the service was made available to a very large number who would not have been otherwise reached. It is estimated that the circulation of newspapers and periodicals that carried the various cotton market news service reports was about 4,500,000.

COTTON LINTERS

The number of requests for the classification of samples of linters by the board of cotton linters examiners increased greatly. Service and Regulatory Announcements, No. 115, was issued October 1, 1928, covering the standard grades for American cotton linters, the classification of samples and bales, and the licensing of classers. Tests have been made of the mattress-felting qualities of grades Nos. 1, 2, and 3 of each of the standard characters, southeastern, valley, and western linters. These tests have demonstrated that the breaking and splitting strength and the resiliency of mattress felts made of linters are directly correlated with the grade and character of the linters. Further work is being done on other grades.

GRADE AND STAPLE ESTIMATES (CROP AND CARRY-OVER)

In compliance with an act of Congress, approved March 3, 1927, a report was made on the grade, staple, and tenderability of cotton carried over on August 1, 1928. Similar reports for the 1928 crop were made each month and a final report on April 19, 1929, for the total 1928 crop as reported by the Bureau of the Census.

The data on which the carry-over estimate was based were obtained by classing a representative portion of the cotton carried over in consuming establishments, public storage and compresses, and on the farms. Estimates of the crop were based on the classification of cotton furnished by gins so

selected as to represent approximately 10 per cent of the cotton ginned in the United States.

In addition, reports were issued for each individual State in the Cotton Belt, as of October 26, 1928, January 4, 1929, and April 19, 1929. A separate report was prepared and forwarded, with a letter digesting such report, to each cooperating ginner, based on the samples received from his gin.

For the first time in history, adequate means were provided in 1928 to make and publish figures on the quality of cotton which took account of the grade and staple of the cotton carried over on July 31, 1928, and for the crop produced in the Cotton Belt.

CARRY-OVER

The Bureau of the Census reported 2,531,000 bales of cotton on hand in continental United States at the end of the year July 31, 1928. Of this amount a little over 95 per cent, or 2,415,000 bales was American upland cotton. Of the American upland cotton, all but 221,000 bales were tenderable under section 5 contracts.

Over 27 per cent of the American upland cotton in the carry-over was 1 and $1\frac{1}{2}$ inches in staple length. The next most abundant staple length was seven-eighths of an inch. The carry-over did not show any overabundance of short-staple, untenderable cotton, there being only 88,000 bales of upland cotton shorter than seven-eighths of an inch.

There were 65,000 bales of Egyptian as against 45,000 bales of all other foreign cotton. Less than 1,500 bales of the Egyptian cotton were shorter than $1\frac{1}{8}$ inches in staple length. Of the other foreign cottons, all but 300 bales were either $1\frac{1}{8}$ inches or longer, or thirteen-sixteenths inch or shorter. This showed that there was practically no carry-over of foreign cotton seven-eighths to $1\frac{1}{8}$ inches, the lengths produced in greatest abundance in the United States.

CROP

Of the 14,269,000 bales in the crop of 1928 as reported by the Bureau of the Census on March 20, 1929, a little over 2,500,000 were untenderable on future contracts, a little over 2,000,000 of these because the staple length was shorter than seven-eighths of an inch. There were 5,947,000 bales only seven-eighths of an inch in staple length. This, together with the $1\frac{1}{8}$ -inch cotton, shows that over 56 per cent of the cot-

ton produced in the United States in that year was seven-eighths inch or shorter in staple length.

In round numbers, 11,970,000 bales of American cotton, or 84 per cent of the 1928 cotton crop, were white, and 6,607,000 bales, or 46 per cent, were of white color and better than middling in grade. The grade produced in greatest abundance was strict middling white, of which there were almost 5,000,000 bales.

There is a very large demand on the part of experiment station directors and the agricultural press for more detailed information. A manuscript for a statistical bulletin embodying all of the above-mentioned facts and showing the staple length in the various States according to soil areas has been prepared. In cooperation with this bureau, the director of the State experiment station of Georgia has prepared a manuscript giving a detailed report of the quality of the cotton produced in Georgia, and the bureau has been advised that other agricultural experiment stations are preparing similar digests.

RESEARCH IN COTTON MARKETING

FIBER STUDIES

Research in connection with the cotton standards has been conducted from three different angles; namely, fiber, ginning, and spinning, with the primary objective of correlating the spinning behavior of the fibers and the properties of the finished product—yarns and fabrics—with the properties and characteristics of the fibers themselves. Scientific studies are being made of the influence of temperature and humidity on cotton classing and the measurable fiber properties.

Research is being conducted on such properties as strength, stretch, elasticity, drag, flexure, and fatigue of fibers representing different grades, staples, and characters. The tests are made of fibers in the different processes of manufacture, beginning with the raw stock and ending with the finished product.

One of the most marked developments has been made in the measurement of uniformity of fiber lengths, the technic of sorting having been perfected to a high degree. Effort is being made to define staple length scientifically and to develop a mathematical basis for the official staple types with a view of eliminating confusion and overlapping and of giving a stable basis for the different types.

The relationship between weight and length for fibers of different lengths is being critically studied. The results from a few samples indicate that weight is not a function of length, and a definite understanding of this relationship or variation in relationship is very important, inasmuch as a number of mathematical computations and technological considerations are vitally concerned.

A study of color and its relation to cotton standardization is being conducted, and considerable work has been done in developing and calibrating new equipment for the measurement of color. Color measurements have been made on material of different grades, staples, and characters at each stage in the process of manufacture. The results indicate that the presence of foreign matter in the ginned lint is an important factor influencing color and that, in the absence of foreign matter, there may be as much color difference between samples of a single grade as there is between samples of different grades. Other grade factors, including the amount and type of foreign matter and ginning preparation, are being studied.

GINNING STUDIES

Research in regard to the effect of gin machinery, organization, and operation on the physical properties of American cotton has been conducted on cotton of different staple, grade, and character. The effects of different cleaning equipment and of the moisture content of the seed cotton at the time of ginning are also being investigated. The disturbance of the uniformity of fiber lengths by ginning, that is, the decrease in percentages of the longer lengths and the increase in percentages of the shorter lengths, is being used as an index of ginning efficiency.

SPINNING STUDIES

Cottons of different grades, staples, and characters have been spun into yarns of different counts and twists. The various forms and amounts of visible waste are being determined. Certain especially selected stocks have been woven into fabrics of different specifications and the final products have been bleached, mercerized, and dyed. Data obtained by the usual methods of yarn and fabric analysis are being accumulated and the remaining manufactured products will be the subject of research. The ginned lint

obtained from different conditions of experimental ginning are being similarly spun in an effort to translate the index of ginning efficiency, as obtained in the fiber laboratory, into terms of spinning behavior and yarn properties. Special studies are being made of such factors as roll settings, weights of rolls, drafts, and twists.

COTTON-MARKETING METHODS AND PRACTICES

Although it has not been possible to develop the project of cotton-marketing methods and practices, a certain amount of work has been done when acute situations arose which demanded information relative to arbitration, allowances, baling, compressing, taring, and patching practices, rules of organized markets and trade groups, and other matters.

United States Department of Agriculture Circular No. 47, entitled "Standardized Cotton Tare in Egypt," has been issued. This circular was very timely in view of the interest in net-weight trading and the use of a lightweight covering for American cotton. Information is being compiled regarding some of the costs of handling cotton in American and European markets. Investigations have also been carried on relative to baling, taring, and patching practices.

SOUTHWESTERN QUALITY PROBLEM

In response to the demand that the Department of Agriculture investigate the difficulties producers are having in some instances of marketing advantageously cotton grown under irrigated conditions, a study of the subject was undertaken.

The plan of procedure has been to trace individual bales of cotton grown under various observed local conditions as encountered by the growers in the irrigated sections of the Southwest, through the usual channels of trade, to the mills where they are consumed. Data are being collected on the behavior of the cotton and quality of the product. These data will be analyzed and correlated with growth data as a basis for recommendations for research in more specific problems of production and marketing.

COTTON-PRICE STUDIES

As a basis for determining the extent to which the price paid to growers for cotton on the primary markets varies

with the quality of the cotton and the extent to which the price paid to growers for cotton on the primary markets varies with the prices of cotton in central markets and with futures, price data for approximately 170,000 individual bales of cotton in 157 markets have been collected and are being studied. Collection of these data has been made in cooperation with the agricultural experiment stations in North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, Texas, Arizona, New Mexico, and California.

UTILIZATION OF AMERICAN RAW COTTON

Work on utilization of cotton is a part of a correlated program of research in which the Cotton-Textile Institute (Inc.) and the United States Departments of Commerce and Agriculture are cooperating.

The new uses committee, composed of representatives of the three organizations, sponsored an exhibit at the National Cotton Show which was held in Memphis, Tenn., in October, 1928. This exhibit was shown in connection with the cotton exhibit of the United States Department of Agriculture and met with great success.

COTTON DEMANDS, TRENDS, CHANGES, AND CAUSES

Basic data have been assembled for a study by countries of the trends and mill consumption of cotton of various growths. Data have also been assembled on the production, consumption, price, export, and import by countries, etc., of the various fibers competing with cotton. These, together with supplementary data, will be used in a study of the competition and trend in world consumption of cotton and other fibers.

ADAPTATION OF COTTON TO NEW AND EXTENDED USES

Studies of cotton bags and other containers in the wholesale grocery trade, and cotton bags in the fertilizer industry, were completed. Mimeographed reports based on both of these studies have been widely circulated. The study of cotton bags in the fertilizer industry shows that only a small percentage of fertilizer is now handled in cotton bags as cotton bags now cost more than burlap bags. Fertilizer dealers advise, however, that they use

cotton bags when possible because it makes an attractive package, gives a better visibility for marking, and has a higher reuse value.

Study of the cotton bags and other containers in the wholesale grocery trade was made in cooperation with the Wholesale Grocery Association and the National Wholesale Grocery Association of the United States. This study indicated that more than a quarter of a million bales of raw cotton and cotton waste go into the manufacture of cotton bags in the United States each year. Most of these bags are used in the wholesale grocery trade, which consumes over 200,000 bales of cotton each year. This study revealed a large potential field for cotton bags where jute bags or bagging are now used, and indicated that the wholesale grocery trade might use more than 600,000 bales of raw cotton and waste each year. Spinning tests made on the garnetted cotton bagging showed that the cotton could be reused, but that it had lost approximately 40 per cent of its original strength. A study of the use of cotton bags and of other ways in which cotton is now being utilized in the power laundries of the United States, is being conducted. Plans have been made to survey the cotton States with respect to the use of the cotton picking bag and cotton picking sheet in an effort to discover the possibilities for increasing the use of cotton through these two uses.

GRADE AND STAPLE ESTIMATES (CONSUMPTION)

An estimate of the grade and staple of cotton consumed in the mills of the United States during the year ended July 31, 1928, was made, which covered 14,200,000 active consuming spindles out of the approximately 33,500,000 such spindles. A mimeographed report entitled "Quality of Cotton Spun in the United States" was issued.

The primary objective has been to show the domestic consumption of cotton by grade and staple length, since the American mills furnish the American grower his largest market. The domestic mills consumed approximately 6,000,000 bales during the year ended July 31, 1928, of which 6,500,000 bales were of American growth. More than 90 per cent of the American cotton was white in color, and 72 per cent of it was Middling or better in grade. The staple lengths consumed most extensively ranged from seven-eighths inch to 1 $\frac{1}{2}$ inches in length, of which

70 per cent was fifteen-sixteenths inch or longer. Most of the cotton imported into the United States during 1928 was 1½ inches or longer in staple.

In the manufacturing of four important products—rubber, pyroxylin-coated fabrics, oilcloth, and mercerized yarn—the quantities of cotton used have been maintained or increased during the past few years. The cotton consumed by these industries is of good quality.

COTTONSEED STUDIES

A plan has been devised for grading cottonseed on the basis of the relative quantity of the chief products obtainable as determined by chemical analysis. A committee made up of representatives of the Bureau of Chemistry and Soils and of this bureau has given careful study to the cottonseed situation and has made recommendations for the more accurate methods of sampling and analyzing samples.

DIVISION OF FRUITS AND VEGETABLES

WELLS A. SHERMAN, *in charge*

MARKET NEWS SERVICE

Steady growth, both in extent and usefulness, marked the year's work under the market news service. The leased-wire telegraph service continued to be the means for rapid dissemination of market news, including shipment reports, arrival and price information, and statements regarding local conditions in producing sections and terminal markets. Sacramento, Calif., was added to the western leased-wire circuit, and the wire was extended from Atlanta, Ga., to Montgomery, Ala. Plans were completed for a material expansion of the service during the fiscal year 1930.

Every available form of publicity has been used to carry to producers and others the information gathered and forwarded over the telegraph wires. Daily mimeographed reports continue to form the "backbone" of the service, although the broadcasting of reports by radio and the use of the press as a means of disseminating market information have been extended and intensified. There is a great demand for the mimeographed reports as a basis for the settlement of railroad claims, many thousands being furnished for this purpose alone. Numerous shippers and dealers maintain complete files of the daily reports for future reference. Approximately 15,327,000 mimeographed market reports

were issued from the 18 market stations and the 40 temporary field stations of the division. This was an increase of 1,759,000 reports over the preceding year, although the mailing lists were revised frequently to remove the names of all persons who no longer desired the service.

Daily shipment information was reported by the carriers and published by this bureau on 35 of the most important fruits and vegetables, and complete market reports were issued in season on 22 of these. In addition regular news services were conducted on peanuts and on honey and beeswax, and special local reports were made on a large number of products during the heavy shipping season.

CARLOAD SHIPMENT INFORMATION

The volume of carload shipments reported by the carriers has gradually increased. The total of 1,088,095 cars of 38 products represents a net total increase of 44,149 cars over the number the previous year. Shipments of tree fruits especially were greater in 1928. As the car-lot movement has increased, there has been a demand for more extensive market news service. Daily telegraphic reports are received at Washington from several hundred transportation lines. These reports show the number of cars originating in each division superintendent's territory. Sixty-four of these reports are known as "consolidated wires," each covering an important railroad system or major part of such a system. Approximately 400 individual reports are received, chiefly from smaller transportation lines. In addition, 15,000 freight and express agents send monthly reports by mail, covering a greater number of products, which amplify and also serve as a check upon the daily telegraphic information. The shipment data have become more complete and accurate each year and are of greater value to the news service. Arrangements have been made in a number of cases to have daily telegrams showing car-lot destinations of certain products sent by carriers direct to temporary field stations.

UNLOAD REPORTS FROM PRINCIPAL MARKETS

Reports of unloads of 19 of the most important fruits and vegetables are received from 66 markets. In 27 of these cities representatives of this bureau obtain the information daily from rail-

roads, express companies and important boat lines. Truck receipts are included whenever it is possible to obtain this information. Railroad agents furnish the reports from 39 cities in which no bureau representatives are located. There is constant demand upon this bureau from growers, shippers, members of the trade, and others, for the unload data. In addition to meeting specific requests, press releases and mimeographed statements are prepared and distributed. The unload data are valuable as a basis for study of the supply and distribution of fruits and vegetables.

COOPERATION WITH STATES

The expense of operating field stations in producing sections continued to be shared by growers and shippers as well as by State agencies. Without this aid, the service would, of necessity, be greatly curtailed. Several States assisted actively in distributing market reports, resulting in a wider dissemination of the information. In a few cases, special cooperative services were conducted on particular crops. For example, a market news program on grapes was rendered in New York and Pennsylvania, the State office at Buffalo issuing the reports on the crop.

REVIEWS, SUMMARIES, AND SPECIAL REPORTS

In the Washington office, current tabulations are maintained of current prices at all the leading markets and shipping points. Special reviews and summaries of market conditions are prepared, as well as articles for trade papers and farm journals. A great deal of information is furnished in answer to special requests. The data are used as the basis for comprehensive statistical bulletins and economic reviews.

A large number of weekly and monthly reviews, which make available in condensed form the data gathered, are prepared and distributed to special mailing lists. These reviews furnish a basis for comparison with previous years. Further work has been done in preparing special weekly and monthly reviews for particular papers, mainly farm journals, in different sections of the country. Some of these outline market conditions and the probable future trends. Effective cooperation has been given the bureau by the Associated Press and by news-

papers generally throughout the country. Special attention has been given to the preparation of market data in the form desired by the press and to the furnishing of the type of information of greatest usefulness to each class of subscribers and to the different sections of the country.

At the close of each temporary field station a summary of the information which was published daily and a general review of the market season for the products of that territory was prepared for the special benefit of those on the local mailing list. This summary points out the successes and failures of the past season and serves as a guide in planting, harvesting, and marketing during the following season. Approximately 50,000 copies of 65 different summaries were issued.

INSPECTION SERVICE ON FRUITS AND VEGETABLES

All previous records were broken for the number of inspections of fruits and vegetables, both at shipping points and receiving points. At shipping points there was an increase of 18,367 cars and at receiving points 5,202 cars, with a total of 266,831 inspections, as compared with 243,262 for last year.

RECEIVING-POINT INSPECTIONS

A total of 37,632 commercial inspections were made at 40 important receiving markets and adjacent points. In addition, large quantities of products were inspected for the United States Navy, the Marine Corps, and other governmental agencies.

Greater demands have been made for service by handlers and receivers of large quantities of fruits and vegetables, such as cold-storage companies and express companies. In some cases special contracts are entered into at a reduced rate when a large number of cars are guaranteed and conditions are favorable for rapid inspection. Some companies furnish labor for opening and closing packages. This expedites the work and reduces the cost to this bureau. The work for large terminal organizations is growing rapidly.

EXPORT STANDARDS FOR APPLES

The export standards for apples promulgated in October, 1928, have been of great assistance to foreign buyers. Official certificates are issued on request for certification for export bearing the statement, "Lot meets U. S. standards for export." These certifi-

cates assure the buyer that the apples were tightly packed, that not more than 5 per cent were off condition, and that the apples were not further advanced in maturity than firm ripe. The adoption of these standards has eliminated much misunderstanding between buyers and sellers and provided a satisfactory basis of trading. A total of 2340 cars was inspected on the basis of the export standards in New York alone.

AUCTION INSPECTION

The agreement entered into with the United States Fruit Auction Co., of Chicago, providing for inspection of juice grapes sold at auction, was renewed at the beginning of the 1928 season, and 1,216 cars were inspected. This work has increased every year since it was started, and buyers, as well as the auction company, have expressed their appreciation of the valuable service rendered by the Federal inspectors.

SHIPPING-POINT INSPECTION

A total of 229,199 cars was inspected at shipping points. Only 190 reinspections were called for at terminal markets, 50 of which sustained the original inspection. Washington showed the greatest increase of any State, the number of inspections being 37,505, as compared to 29,497 for the previous year. Nearly all shipping-point inspections were made under cooperative agreements with various States. In Louisiana and South Carolina the agreements provide that the joint employee may devote such time as is not required for supervision of inspection work to extension work on standardization or marketing. These arrangements have proved highly satisfactory as a means of rendering service to growers.

INSPECTION OF CANNERY TOMATOES

Inspection of cannery tomatoes when delivered to the factories has been a recent development. During the past year 10,097 growers' loads were inspected in Indiana and New York, and experimental work was carried on in Delaware in cooperation with the State bureau of markets. The prospects are that the work will be greatly increased this season in Indiana, New York, and Pennsylvania, and experimental work will be carried on in a number of other States. Both the growers and the buy-

ers who have tried the system are heartily in favor of trading on the basis of the special United States grades recommended for canning stock.

RESEARCH AND STANDARDIZATION

Standards have been prepared to date for 44 of the principal fruits and vegetables. Since two or more sets of standards are necessary for different types of the same commodity if it varies widely, 57 United States standards have been issued. A number of the standards were revised during the year, and new sets were issued for 6 additional products. Much interest has been shown and many requests have been received for the establishment of additional standards. The trade is particularly desirous of having grades established for various canning crops.

The success and popularity of the market inspection and market news services has been tremendously increased by the preparation of standards which have met the needs of the trade. These services have been closely coordinated with the research work on methods of packing, grading, handling, and marketing these products.

In addition to the statistical publications containing detailed information on production and distribution of fruits and vegetables, bulletins have been prepared covering the marketing of a number of crops. A Farmers' Bulletin on marketing late-crop potatoes contains up-to-date information on conditions and practices in the important commercial producing areas and markets. The relation of supply to average seasonal price, which is of vital importance in successful marketing, is treated and illustrated graphically.

Increased interest has been shown in recent years by growers and shippers in economic studies of production and marketing of various fruit and vegetable crops. Information on the probable trend in production, costs of production, trade channels and methods, consumers' demand and preferences, distribution, grading, competition, prices, and other phases of marketing have been requested for many crops. A number of the divisions of this bureau cooperate in this type of work.

An economic study of the apple industry has been completed recently. A feature of this study was an analysis of the apple receipts by varieties and States of origin in 41 cities which receive two-fifths of the carload ship-

ments of apples of the United States. The information on varietal composition of market supplies, obtained from records and estimates of dealers, has never been available heretofore and should prove of value to the apple industry. Detailed information was also made available on auction and jobbing prices, containers, trade and consumer preferences and practices, local receipts, redistribution of carload receipts, and other matters of interest. A similar study covering the pecan industry is being conducted. An economic study of the eastern grape situation is being made in cooperation with the New York State College of Agriculture, and of the canning-peach industry in cooperation with the State of California. At the request of the prune growers' associations, a study is being made of the fresh-prune industry of the Northwest.

The motor truck has become an important factor in the commercial movement of fruits and vegetables. Figures on car-lot shipments and receipts are in many cases inadequate for market news and statistical purposes on account of the large quantities transported by motor truck. To obtain definite information on this movement, a study was undertaken in cooperation with the State of New Jersey and the New York Food Marketing Research Council. Arrangements were made a year ago with 100 dealers on the New York jobbing markets to report by telephone to our market news office their motor-truck receipts of each fruit and vegetable by States of origin. This information is published daily as a part of the market news service. Successful operation of this service has led to the establishment of similar services in a number of other cities. A study is being made of the distribution of motor-truck shipments and the conditions under which the motor truck is used and its effect upon marketing fruits and vegetables.

The bureau's fruit and vegetable foreign marketing specialist stationed in London continued to furnish valuable information to exporters with respect to European conditions and prices. A biweekly circular was issued in London and forwarded to European agents who distributed American fruits, containing information on grades, inspection, movement, and prices in the United States. The foreign marketing specialist spent several months in the United States attending meetings of growers and shippers, discussing fruit-export problems, and fur-

nishing information on European markets to those interested.

STANDARD CONTAINER ACTS

The passage of the standard hamper and basket act of 1928 greatly increased the standard-container work. In addition to the grape baskets and berry boxes which were included under the act of 1916, hampers, round-stave baskets, and splint baskets are now under the jurisdiction of the department.

These acts are administered as a service project; only one prosecution has ever been found to be necessary. A large volume of work is necessary in making tests and measurements of the samples of containers submitted in order to pass upon their legality. A much larger percentage of the samples of the large containers covered by the act of 1928 have been found to be non-standard than has been the case with the smaller containers covered by the act of 1916. More conferences with manufacturers have been necessary, and more educational work has been done. Very satisfactory progress has been made, however, and excellent cooperation has been given the bureau.

PRODUCE AGENCY ACT

There has been a great increase in the number of cases which seem of sufficient importance to justify personal investigation, and complaints have been received which involve serious abuses. Although a number of complaints have related to minor matters, shippers in general have realized that cases should be submitted to the department only when they believe actual violations of the act have taken place. Of the 229 complaints received, 134 were personally investigated. In 43 cases upon which reports have been made as to the amount due in settlement, a total of \$4,608.20 has been paid to the complainants. Payments have been made in other cases, but complete returns have not been made to this bureau. To date, only 1 case has been brought to trial. In this case the defendant pleaded guilty and was fined \$100. A number of cases were before the Department of Justice at the close of the year.

The work of the year has demonstrated that many real abuses exist in the fruit and vegetable industry and that a great deal of work remains to be done looking toward their correction. Fine cooperation has been given to the bureau by the majority of the trade.

DIVISION OF LIVESTOCK, MEATS, AND WOOLC. V. WHALIN, *in charge***GRADE STANDARDIZATION****LIVESTOCK AND MEATS**

The tentative standards used as the basis for the market news service were continued and their use carefully scrutinized. Most of the investigational work centered on hogs and lambs, special attention being given to the former.

Partly as a result of the natural increase in interest in livestock standardization and partly through the needs which have developed in connection with the direct marketing of hogs on a large scale, an active demand for standards for hogs on the part of both producers and packers has developed. Several meetings with representatives of livestock shippers and the Institute of American Meat Packers were held and standards for a set of six grades for slaughter barrows and gilts were formulated and submitted to the industry for criticisms and suggestions.

Tentative standards for grades of lamb were worked out. Side-view and top-view photographs of the different grades of lambs, live and dressed, were taken, and measurements were made of approximately 550 lamb carcasses to determine the relative dimensions of animals representing the different grades and to establish the relation ship of physical factors to grade.

A correlation study of the grades of live lambs and their carcasses was made to determine the grade of the dressed product obtained from lambs usually graded as culls or throw outs by packer buyers. Small lots of these cull lambs were graded and photographed alive, and later graded as carcasses. A large number of the live lambs that were sorted out as culls by the buyers yielded carcasses that were graded from one to two grades higher by both the department's grading committee and the packer's grading expert.

Service and regulatory announcements were published, covering official standards for slaughter cattle, vealers, and slaughter calves, and for veal and calf carcasses. A publication outlining the advantages of standards for livestock and meats was issued. Manuscripts have been drafted covering market classes and grades of yearling beef, market classes and grades of pork carcasses and fresh-

pork cuts, and grades and the retail cuts of beef. Colored posters illustrating standards for steers, cows, and heifers were completed.

WOOL

Increased interest has been manifested in the subject of wool standards both in this country and abroad. At a meeting of the International Wool Conference held in Paris in November, 1928, the French delegation recommended that the United States standards be made the basis for all negotiations. The matter was placed in the hands of a committee for study and report at the next meeting of the conference in 1929. In the tariff bill pending in Congress the standards are made the authority for the determination of the grade of wools imported into the United States and dutiable under the act.

For the purpose of investigating the factors which affect the shrinkage of wool, the division has carried on an extensive program in wool-scouring research. Hundreds of samples of wool have been tested in the laboratory under semicommercial conditions. For the third consecutive year tests have been made on wools from several flocks in selected localities, and interesting data have been obtained. When completed the results of the investigations should provide a scientific basis for the estimation of the shrinkage and yield of United States wools and should be of great assistance to American wool growers.

The moisture question is extremely important in wool marketing, since wool shipped from an arid region to one of greater humidity gains considerable weight. Wool that has been scoured and dried on standing absorbs moisture also. An attempt is being made by this bureau to work out the relation between the grade of wool and the moisture content and "regain" and to devise satisfactory tests for measuring moisture content.

MOHAIR

The great expansion in the mohair-growing industry has made the need for standards for the grades of mohair more imperative. At meetings held with producers in a number of States the work was discussed. Important contacts were made with dealers and manufacturers in the New England States, where manufacturing activity

is centered, and the cooperation of a number of these interests was obtained.

Tentative grades for the preliminary classification of mohair for marketing have been formulated. Practical forms of these grades are in preparation for distribution among dealers, manufacturers, producers, and others, in order that the grades may be widely reviewed and given commercial application. Further investigational work will be done by members of the staff.

HIDES AND SKINS

Material progress was made in developing standardized grades for hides and skins. Approximately 3,700 copies of the tentative schedule of market classes and grades of hides and skins were mailed to tanners, brokers, dealers, and producers for suggestions and criticisms. Several conferences were held with groups of users of hides and skins, and with livestock slaughterers, whose annual production totals 15,000,000 hides and skins. Approximately 700 tests were conducted at tanneries to determine the correlation between the qualities of the raw hide and the qualities of the finished leather. The results obtained from these tests will be very helpful in developing standardized grades on a sound and practical basis.

QUALITY-OF-MEAT STUDY

A study of the factors which make quality and palatability in meat is being carried on in cooperation with the Bureau of Animal Industry, the Bureau of Home Economics, and the State agricultural experiment stations. In connection with this study during the past year 676 cattle, 110 hogs, and 750 lambs were graded. The data which have been collected up to the present time through the grading of more than 2,000 cattle have been placed on cards and when tabulated and analyzed are expected to show the changes in grade resulting from intensive feeding; the relative ability of graders to ascertain the carcass grade of an animal before slaughter; the effect of daily and total gain in weight on carcass grade; the effect of kind of feed, geographical location, and breed upon the carcass grade; and the causes of change in grade from beginning to end of feeding period with calves, yearlings, and mature cattle of both sexes.

METHODS AND PRACTICES OF MARKETING

DIRECT BUYING OF HOGS

The work of compiling and analyzing data relating to the direct buying of hogs by packers was continued. Results to date indicate that the expansion of operations by interior packers (those located away from terminal markets), together with the decrease in the volume of receipts at the terminal markets, has stimulated a general move on the part of a number of terminal-market packers to supplement their central-market purchases with hogs bought direct in the country.

The tremendous growth of direct buying during recent years can, perhaps, be partially explained by improved transportation. The extensive highway-development programs of many States, together with increased use of the motor truck for livestock transportation, have tended to foster direct buying by enabling the interior packers to enlarge their territories and by insuring adequate supplies to operate their plants. The expansion of livestock truck transportation has been enormous, and, according to recent figures, the movement has not yet reached its peak.

The use of the radio and the standardization of market news has kept the livestock producer in close touch with the market and has given him information on which he could sell his hogs more intelligently than ever before; hence he is not averse to selling his stock direct if the opportunity offers.

SUPPLY, DISTRIBUTION, DEMAND, AND PRICE STUDIES

Analysis and interpretation of economic information obtained through the market news service and other sources continues to be a major research activity. Results of these studies are presented to the public in the form of the semiannual outlook reports on cattle, hogs, sheep, and in reviews, radio talks, and special reports dealing with various phases of the livestock situation. This information helps producers to make proper adjustments in their production and marketing programs, and enables distributors to effect more efficient and economical distribution of product. The Livestock Review for 1928 was published as Miscellaneous Publication 54, and 17 radio talks analyzing economic

conditions in the industry were broadcast over a chain of stations that serve the major portion of the country.

STATISTICAL SECTION

The market news service and other activities of the bureau furnish a volume of statistics which are compiled as permanent records to serve as a basis for research work and recommendation for improved production and marketing methods. Among these compilations are the following: Daily livestock prices by 60 classes and grades at 23 markets; daily fresh-meat prices by 43 classes and grades at 4 markets; daily cured-meat prices by 20 classes and grades at 4 markets; weekly wool prices at Boston; weekly, monthly, and yearly averages of prices; daily receipts of cattle, calves, hogs, sheep, horses, and mules at 18 markets; and classes of meat covered by meat-grading projects. In addition a very large number of reports and summaries are prepared regularly for various mailing lists of those desiring special information and for agricultural journals and newspapers.

PUREBRED LIVESTOCK PRICE SURVEY

The seventh purebred livestock sale-price survey, covering sales in 1928, was made, and the results were summarized in 19 separate reports. This survey indicated that the trend of purebred livestock prices during 1928 continued upward for beef and dairy cattle and for sheep, but that the prices of purebred hogs declined. Information of this kind, based on actual reports of breeders, tends to stabilize prices and informs buyers and sellers as to prevailing values. It should result in stimulating the demand for purebreds and thus tend to bring about an improvement in the general quality of all livestock produced.

QUARTERLY WOOL STOCK REPORT

Surveys were made of stocks of wool, tops, and noils in the hands of dealers in the United States. Approximately 300 dealers were circularized. These data were combined with reports on holdings of manufacturers, as obtained by the Bureau of the Census, and published in mimeographed form. The reports provide a basis for more intelligent action by producers, dealers, manufacturers, and various branches of the Government.

MARKET NEWS SERVICE ON LIVESTOCK, MEATS, AND WOOL

Branch offices were maintained in 24 cities throughout the year. The leased wire was extended to Sioux City, and the service was expanded so as to put it on a comparable basis with other large markets. Extension of the leased wire to Montgomery, Ala., made it possible to give wider dissemination to market information through the South. Plans were made for inaugurating a meat-reporting service in San Francisco and enlarging the meat-reporting service in New York City to include locally dressed meats.

A report of average wholesale prices of fresh and cured pork products is now made available monthly from Chicago and New York. In order to keep the public informed as to important changes in slaughter supplies of hogs, arrangements were made for releasing weekly figures of inspected hog slaughter at nine important market centers. To meet the situation brought about by the increase in direct marketing, arrangements were made for releasing and disseminating, early each morning, reports segregating receipts of hogs consigned direct to packers from those consigned for sale on the open market. To make the Boston Weekly Wool Market Review of greater value to the trade, the release date was advanced from Wednesday to Monday, thus making it possible to get the report to subscribers 48 hours earlier than previously.

Much attention was given to increasing the scope and value of the daily and weekly market reports prepared for radio release. Not only were the style and content of the reports improved, but greater attention was given to the utilization of broadcasting stations best qualified by power and equipment to render the most effective service. Approximately 100 broadcasting stations located in all sections of the country are now making use of the market news service without expense to the bureau.

At the request of the carpet-wool users, an information service on the crop prospects in the carpet-wool-producing countries was inaugurated. Information obtained by department representatives and members of the Consular Service, abroad and from other sources, is made available to the industry through mimeograph releases.

The World Wool Situation, a mimeographed report of 10 to 15 pages, covering many aspects of the wool sit-

uation in this and in foreign countries, was prepared and released each month.

Expansion in the dissemination of practically all types of reports released was marked, and a greater degree of accuracy and clarity was obtained. The cooperation given by the leading press associations was very gratifying. More livestock and wool market information than ever before was sent over the various telegraphic news circuits of the press associations. One leading association reports that some of this information was sent over each of its circuits daily during the year. An incomplete survey of newspapers utilizing press-association services revealed that approximately 700 press-association papers were using the reports. Trade and agricultural papers also made greater use of the reports, and livestock commission and stockyard companies utilized the service more generally than heretofore in connection with their market letters and advertising circulars. A total of 4,419,429 mimeographed market reports were released.

No reduction in the CND services of the commercial telegraph companies was apparent during the year despite the increasing use of radio as a prompt and dependable means of news dissemination.

EDUCATIONAL DEMONSTRATIONS AND SERVICE

One representative devoted a large part of his time to attending meetings of livestock producers, vocational agricultural students, and others interested in livestock marketing, at which he gave demonstrations in livestock grading and delivered addresses on consumer preferences, market requirements, and methods of adjusting production to demands to bring increased returns. He visited 11 States, attended 11 State or district livestock association meetings, and held about 75 demonstration or livestock-improvement meetings. Other representatives attended meetings of retail meat dealers, purchasing agents, vocational students, and livestock producers at which they delivered addresses on economic conditions in the livestock and meat industry. In addition, a number of demonstrations were made and exhibits shown explaining and demonstrating the classes and grades of livestock, meats, and wool at livestock shows and expositions.

MARKET-GRADING SERVICE

The meat-grading service was carried on in 15 cities. There was a

marked increase in the quantities of meat graded at practically all points and particularly at the larger markets, such as Chicago, Kansas City, New York, and Boston. Approximately 23,500,000 pounds of meat (excluding beef graded and stamped) was graded; almost half of it was for Federal institutions and slightly more than half for commercial concerns.

BEEF GRADING AND STAMPING SERVICE

The beef grading and stamping service was continued at eight market centers. Four beef graders were employed full time on beef grading, and four other employees devoted part time to the work. A total of 58,571 carcasses, representing the equivalent of 31,712,000 pounds of beef was graded and stamped.

The interest in beef grading and stamping has increased materially since its inauguration. Meat retailers, hotel-supply houses, dining-car service of various railroads, and others use the service. Large chain-store organizations are constantly increasing the quantity of graded and stamped beef handled in their markets from week to week.

GRAIN DIVISION

H. J. BESLEY, *in charge*

ENFORCEMENT OF THE UNITED STATES GRAIN STANDARDS ACT

General field headquarters were maintained at Chicago, as well as the central board of review and the force in charge of inspection efficiency. Under direction of general field headquarters, Pacific coast headquarters were maintained at Portland, Oreg. There were 4 division supervisors and 35 district offices.

At the close of the year there were 162 inspection points in 35 States, and 479 licensed inspectors. Hearings were held in 8 cases involving violation of the grain standards act, and recommendation for the publication of findings were made in 6 of these. Investigations were made in other cases of irregularities, and adjustments were brought about. Attention of 70 shippers was called to the fact that grain of inferior quality was found in the bottom of the car, and that proper samples could not be obtained from such cars by ordinary methods.

ACTIVITIES UNDER FOOD AND DRUGS ACT

In addition to the enforcement of the United States grain standards act, this bureau cooperates in securing com-

ppliance on the part of the grain trade with the provisions of the food and drugs act in so far as that law applies to whole grain. Under the food and drugs act, the bureau has undertaken to prevent the mixing of a product commonly termed "screenings," as well as the mixing or blending of distinctly low-quality grain with sound grain since practically all wheat and much other grain which meets the requirements for grade No. 2 is intended for human consumption.

The usual effort of many terminal elevators is to blend several qualities of grain together so that the resultant mixtures will barely come within the limits of the No. 2 and No. 3 grades of the official grain standards, which are the usual contract grades. Abuses of the mixing practice assumed such proportions that special attention was given to preventing adulteration of sound grain by addition of screenings and low-quality grain. More than 200 carload lots were formally objected to for mixing purposes, and information was requested as to their disposition. Cooperation was received from export elevators and from grain exchanges in preventing this practice.

SPECIAL GRADING PROBLEMS

The 1928 hard winter wheat crop was comparable with the crop of 1927; it was well matured and of good weight, but adverse weather conditions at harvest time, use of the combine, and poor or inadequate storage and handling conditions resulted in a considerable quantity of out-of-condition, musty, and heat-damaged wheat. The rancidity test developed in the grain division research laboratory to determine the facts relative to musty or out-of-condition grain has proved to be of immeasurable assistance to the board of review in its interpretation of musty and out-of-condition odors.

Because of heavy winter-killing, the soft red winter wheat crop was extremely short and presented no major grading problems. Conditions affecting the hard red winter and durum wheats were practically identical with conditions last year, but probably a little more of the crop fell in the lower grades on account of frosted and green wheat caused by early killing frosts in the northern part of the spring wheat belt. Pacific coast wheats graded high, with no outstanding grading problems.

The corn crop was one of the best in years, moisture and test weight being the principal grading factors.

The oats crop, as a whole, was below average in general appearance because of unseasonable weather at harvest time, so that little of the crop fell in the first two grades.

The barley crop in the Central States was affected with scab. Much of the barley from this section was graded sample grade on account of "distinctly low quality." This became a major grading problem in which the test for rancidity again proved useful.

The rye crop carried the heaviest infestation of ergot of that of any year since the Federal grain standards were established; consequently, ergot was an outstanding grading factor. Two of the larger terminal markets resorted to washing rye for the purpose of removing the ergot. Poor processing resulted in some rye grading sample grade, but as processing methods improved this trouble disappeared.

Complaints of the manner in which the standards have been interpreted have been mostly to the effect that the grades were too rigidly applied and that this application resulted in loss to producers and country shippers of grain. Normally, from 80 to 95 per cent of the production of any given crop is of a quality which admits it into one of the higher grades, and it has been the consistent view of the bureau that grain of good quality should be protected in commerce by the exclusion of low-quality grain from the higher numerical grades. The basic price of a commodity is lowered if an inferior product is admitted under a grade, brand name, or trade-mark that presumes to represent a commodity of higher quality.

INSPECTION EFFICIENCY

Marked improvements were brought about in the accuracy of the inspection work and in the uniformity of application of the Federal standards. Additional supervision has resulted in greater care on the part of the licensed inspectors in grading of shipments of grain from all markets, especially from points at which no supervision offices are located. The supervision work was supplemented by an active campaign to bring about a better understanding of the Federal standards on the part of country grain dealers for the purpose of improving inspection uniformity throughout the country.

Four multigraphed reports covering general information concerning stand-

ardization of grain, methods of handling and storing grain to maintain or improve its grade, and grain-inspection methods and procedure have been given wide distribution through publication in five grain-trade papers and in agricultural publications. In this way general instructions and information have been circulated to practically all grain dealers in the United States. There has been a demand for supplies of these reports from agricultural colleges conducting courses in grain grading and country-elevator management. Supplies of the reports and publications regarding grain inspection have been sent to 15 agricultural institutions for use in classroom instruction and grain-grading laboratories.

Close cooperation has been maintained with grain dealers' associations. They have assisted in the distribution of educational material and arranged sectional meetings at which grain-grading instructions were given. Grain-grading instructions have been given by supervisors at over 200 meetings of grain producers and growers at country points east of the Pacific coast division. It is the experience of the supervisors conducting the grain-grading demonstrations at country points that country dealers are anxious to learn how to apply the standards and that they realize the necessity for grading grain, especially their shipments to terminal markets, if they are to protect fully their own interests through calling appeals under the United States grain standards act. Country dealers are learning to grade grain purchased from growers, thus carrying the benefits of standardization to the growers through premiums paid for grain of superior quality.

A large quantity of grain was moved long distances on shipping-point inspection, for example, west-coast soft wheats moved to southeastern mills to meet the deficiency in soft red winter wheat; and high-protein hard wheats were shipped from the Southwest to the milling centers.

Progress was made in the tabulation and analysis of data showing why the different crops of grain have been of the grades assigned. This information shows the relative importance of such grading factors as damaged kernels, moisture, and mixtures of other wheats in the various crops, and in grain from the different sections of the country. Such information has been used extensively by crop-improvement associations and agronomists in planning field work, and has been used

effectively in educational work in showing the necessity for grain grading at country points as a means of preventing losses in handling and mixing grain.

GROWTH OF APPEAL SERVICE

The year just closed again broke all previous records for the number of appeals handled by offices of Federal grain supervision. These appeals were called by interested parties from inspections performed by licensees and resulted in the issuance of Federal grade certificates on 84,135 lots of grain. The majority of these appeals involved single carloads of grain, but many of them covered large quantities of grain shipped in bulk by vessel and barge on the Great Lakes and Mississippi River as well as a few in the export trade. For example, 457 of those appeals handled by grain supervisors at the various inland ports and export markets covered a total of 28,000,000 bushels of different kinds of grain. In addition to the appeals taken directly to the local offices of Federal grain supervision, 1,725 board appeals were taken to the boards of review at Chicago, Ill., and Portland, Oreg.

Buyers and sellers of grain, including producer's representatives at certain of the larger terminal markets, continued to take advantage of this privilege afforded them by the terms of the United States grain standards act. At the Omaha market 5,309 appeals were handled during the fiscal year; at St. Louis, 7,302; at Minneapolis, 10,876; at Kansas City, 11,534; at Chicago, 12,238; and at Duluth, Minn., 21,207 Federal appeals were entertained.

Pursuant to the requirements of the law, fees were assessed and collected on all appeals not sustained. This resulted in the collection of \$85,243.98, which sum was covered into the Treasury as miscellaneous receipts.

CLEANING GRAIN AT THRESHING MACHINES AND COMBINES

Studies and experiments pertaining to the cleaning of grain at the threshing machines and combines by means of a specially designed cleaning machine attached to the threshing machine or combine so as to effect the cleaning automatically as a part of the threshing operation have been continued. This work has demonstrated the practicability of this method of cleaning grain, and has shown that the cost

of handling the grain on the farm is reduced, a higher price is received, and the screenings are saved for use as feed for livestock. Farmers have come to recognize the advantages and profits resulting from this method of cleaning grain. Assistance has been rendered manufacturers in designing special thresher cleaners with the result that several hundred of these special cleaners were manufactured and were in operation in the spring-wheat area during the 1929 threshing season.

COMBINATION CLEANING AND TREATING OF SEED GRAIN

To encourage efficient cleaning and treating of seed wheat on the farm assistance was rendered to the Minnesota College of Agriculture and to a group of farmers in California in designing and building a portable combination seed-grain cleaning and smut-treating machine. The combination machine in California was operated commercially as a community enterprise. Several additional combination machines were built by other groups of farmers and individual operators. The combination machine in Minnesota was demonstrated through operation in various centers throughout the State with highly satisfactory results. As a result of these demonstrations commercial manufacturers of grain cleaners and smut-treating machines have begun the manufacture of combination machines, which are now coming into common use. A department leaflet on the subject was prepared by this bureau in cooperation with the Extension Service, Bureau of Plant Industry, and the California State Extension service, and was published and given wide distribution.

SEED-GRAIN SURVEY

A survey was made of the seed wheat planted in the spring-wheat area. Samples of the grain that was actually being planted on a large number of farms in Minnesota, North Dakota, and South Dakota were taken from the seed drills. These samples were analyzed and tested for admixtures of weed seeds, other grains, other classes of wheat, and for smut infestation. The samples were also tested for germination. The results of these tests show that much of the grain that is planted in that area is undesirable from a high-class-seed standpoint. A report of the results of the survey is in course of preparation.

MAINTAINING QUALITY AND CONDITION OF COMBINE-HARVESTED GRAIN

Investigations pertaining to the effect on the quality, condition, and market value of grain harvested with combines were continued. Results show that grain harvested with combines is of as high quality, in as sound condition, and of as high market value as grain harvested and threshed by the older binder or header and stationary threshing machine method, provided certain precautions are observed in the combining operation.

A bulletin on the subject pertaining to wheat produced in the spring-wheat area, prepared by this bureau, the Bureau of Public Roads, and the North Dakota Agricultural College, was published by the Agricultural College of North Dakota. A similar bulletin prepared by this bureau and the Minnesota College of Agriculture was published by the Minnesota College of Agriculture.

FARM GRAIN STORAGE

In cooperation with the Bureau of Public Roads studies were made of the advantages of farm grain storage and of the types of storage suitable for use on farms. Results show that properly designed farm grain storage makes possible a system of more orderly marketing, reduces car shortages and embargoes, reduces the number of persons necessary to handle the crop, facilitates cleaning grain on the farm and at country elevators, prevents the need of piling newly threshed grain on the ground, facilitates conditioning of grain before selling it on the market, and enables farmers to sell wheat on a protein basis. Department Leaflet 46, entitled "Farm Grain Storage," was published.

RICE-GRADING SERVICE

Practical assistance has been given to the rice growers through the inauguration of cooperative grading services in Texas and California and in bringing about widespread use of the grades for rice recommended by this bureau. The Department of Agriculture of the State of California reported that since the Federal-State rice-grading service had been put into operation rice had been shipped to foreign countries which had never before been considered as markets for rice from California, and that for all the lots exported on the basis of the in-

spection certificates not a single complaint of quality or grade had been received.

Under agreement with the State of Texas, approximately 1,200,000 barrels of rough rice were graded by a licensed grader. In addition to using this service in the marketing of the crop, the American Rice Growers' Association furnished each grower with a copy of a grade certificate showing the quality of his product. Rice growers, as well as officials, of the cooperative associations, stated that the grading service was of great assistance to them.

The grading work has made it possible to compile useful statistical data relative to the quality of the crop in various sections. The growers, through their cooperative associations, are formulating a crop-improvement policy. At the suggestion of this bureau, a policy of testing each grower's seed was adopted by the association, with the result that much inferior seed was replaced by seed of better quality.

Further educational work was done on methods of handling, drying, and storing rice. A rice-scouring machine was devised by an employee of the bureau which removes the bran from the rice in order that a sample of rice may be graded with greater accuracy.

BULK HANDLING OF GRAIN AND RICE

Investigations pertaining to the bulk handling of grain and rice on the farm and at the country stations in the Pacific coast area were continued. Grain and rice produced in that area are still largely handled in sacks. Considerable progress is being made in changing over from the sack to the bulk method of harvesting and handling grain and rice. The investigations completed so far show that, by handling in bulk, material savings can be made in the time, labor, and cost of producing the crop; and that further economies are effected by marketing the crop in bulk. When grain and rice are sold and delivered to the terminal markets in bulk, savings are made in that sacks need not be purchased, less labor is required, and weighing and inspection charges are less than for sacked grain. The smutting charges for smutty wheat in bulk are less than for smutty wheat in sacks. Grain can be loaded into and unloaded from railroad cars and elevators at a lower cost when in bulk than when in sacks. The cost of loading export grain into

ships is less for bulk grain than for sacked grain, and in addition the speed with which grain in bulk can be spouted into the vessels frequently saves heavy demurrage charges for the vessels. The agricultural engineering division of the University of California is cooperating in the bulk-handling investigations.

DIVISION OF DAIRY AND POULTRY PRODUCTS

ROY C. POTTS, *in charge*

RESEARCH PROJECTS

A study of wholesale egg quotations in San Francisco and an analysis of factors relating to price of Pacific Coast White Extras has been carried on to determine whether the use of the San Francisco wholesale market quotations for eggs, as the basis both for buying eggs from producers in central California and for selling is fundamentally sound. It is aimed also to ascertain whether influences are in operation which prevent the market quotations on the San Francisco market from reflecting true wholesale market values, and if this be true, to suggest modification in the exchange rules and market practices which will relieve such conditions. A local study is being made of price problems affecting the New Jersey egg production.

A comprehensive study was begun on the measurement and analysis of the factors which influence the price of eggs. Average monthly prices have been compiled and price differentials are being studied.

Studies are under way covering both rural and urban per capita consumption of dairy and poultry products. These studies require the compilation of extensive statistics, only a part of which are readily available. These studies are making available information which shows the trends of demand and consumption. A detailed study of consumption and utilization of dairy products is being carried on in six selected townships in New Jersey, and a study of consumers' habits and preferences for eggs is being undertaken in cooperation with the University of Illinois.

BUTTER-GRADING SERVICE

The butter-grading service available at Washington, D. C., San Francisco, Los Angeles, New York, Boston, Chicago, Philadelphia, Minneapolis, Duluth, and Bellingham, Wash. The

work at New York, Chicago, and Washington, D. C., is Federal. At Minneapolis, Duluth, San Francisco, Los Angeles, and Bellingham the services are Federal-State in character. At Boston and Philadelphia the services are carried on in cooperation with local produce exchanges. In all cases supervision of the conduct of the grading work rests with the Department of Agriculture at Washington. During the fiscal year a total of approximately 130,000,000 pounds of butter was graded, as compared with about 120,000,000 for the previous year. This amount is nearly 10 per cent of the total annual butter production of the United States. A number of additional firms received approval of applications for the use of certificates of quality in individual packages during the year.

CHEESE-GRADING SERVICE

Cheese-grading service is available at all markets at which butter grading is carried on, with the exception of Duluth, Minn., and Bellingham, Wash. The cheese-grading service has not yet developed into a large project. Total quantities graded during the year were about 550,000 pounds. This is an increase of nearly 200,000 pounds over quantities graded the previous year. Preliminary work has been done in connection with a proposed cheese-grading service in Wisconsin in cooperation with the Wisconsin State Department of Markets. This service is intended to cover fancy aged American cheese, and each cheese is to be stamped with the grade.

EGG-GRADING SERVICE

Egg-grading services are available in New York, Chicago, Boston, Philadelphia, San Francisco, Los Angeles, Washington, Detroit, Parkersburg, W. Va., and at eight points in Virginia. In the large terminal markets this service is carried on either independently or in cooperation with some other agency such as the State, the produce exchange, or the board of commerce. The grading services at country points in Virginia are carried on in cooperation with the State Bureau of Markets. During the past fiscal year there were graded at these various points a total of 335,000 cases of eggs.

The work in West Virginia, in Virginia, and at Detroit, Mich., was developed during the year. Plans were completed for the inauguration of an egg-grading service at Seattle, Wash., and one at Portland, Oreg.

POULTRY-GRADING SERVICE

A regular poultry-grading service is carried on in Washington, D. C. Approximately 114,000 pounds of poultry was graded for the Marine Corps and for hospitals of the Interior Department and the Veterans' Bureau.

It is planned in the near future to hold hearings at several points in the United States on the tentative United States standards and grades for poultry. It is planned to extend the poultry-grading work to markets where there is a call for it and where egg-grading services are already in existence.

TURKEY-GRADING SERVICE

An interesting grading service on turkeys has developed during short periods just previous to Thanksgiving and Christmas. This work was first undertaken in Washington in 1927. The turkeys were examined individually, and those which met the specifications for United States prime were so stamped on their backs. In addition they had attached to the wing a tag giving the grade and a statement of the purpose of the grading. The turkey-grading work at that time was so successful that it resulted in a demand greater than the facilities of the bureau could supply. In 1928 more than 1,700,000 pounds of turkeys were graded at about 10 points in cooperation with State agencies.

POULTRY-INSPECTION SERVICE

The poultry inspection service consists of the live-poultry-inspection work at New York and the dressed-poultry inspection for condition and wholesomeness at various points in the East and Middle West. This inspection service differs radically from the poultry-grading service. The live-poultry-inspection work is confined to New York City and near-by terminal points. The purpose of the inspection is to determine if the live poultry received for use in New York is in a healthful condition and that it has not been overfed. This work is carried on in cooperation with the New York Live Poultry Commission Merchants' Association, which acts as the fiscal agent, receives the fees charged for the service, and disburses them to meet the costs of the service.

The bulk of the poultry inspected is received in car lots from various points in the Middle West and South. During the past fiscal year there was in-

spected in New York and vicinity the equivalent of 12,139 cars of live poultry.

The dressed-poultry inspection service is a new development. It consists of the examination of each poultry carcass upon evisceration. It was begun originally for poultry which was to be used in the preparation of various canned poultry products. All costs of the service are borne by the plants receiving it. Poultry products canned in an establishment where the poultry is inspected are put up under labels which bear the inspection legend of this bureau. During the last few months there has been a strong demand for the extension of this service to middle-western points, as a result of which the bureau has established a supervision office at Chicago.

During the past fiscal year there were inspected at the points where this service is in effect over 10,000,000 pounds of poultry. It is interesting that the demand for canned-poultry products seems to be increasing rapidly. It is probable that the inspection service has had an influence as it has been a factor in creating confidence in the canned-poultry products.

RESEARCH REGARDING STANDARDS

The investigation work in the technical phases of poultry and egg marketing has been confined primarily to the formulation of standards and grades for poultry products. Decided progress has been made in the development of the grades for dressed poultry, and during the last year some modification has been found to be necessary. These standards and grades have been redrawn and are now ready for further try out and for hearings which may be held in the near future.

The grades for turkeys are a part of the general United States grades for poultry. They have received a more extensive try out than some of the other poultry grades. As the result, they have been revised to provide a greater number of grades than was originally intended. It is expected that the turkey-grading work this coming fall and winter will bring about the formulation of these grades in final form.

The United States standards and grades for eggs have been in tentative form for a number of years and have received rather extensive use. Recently a slight change was made in the United States standards applicable to individual eggs, and a change was

made in the grades for use in the retail trade, designed to bring about simplification and to meet the needs of the industry.

DEMONSTRATION WORK

Egg graders have been instructed at all points at which the service is maintained. As the result, a number of qualified graders have been licensed, and assistance has been rendered to the State egg inspectors in connection with the work with which they are charged. Two small schools were held for the purpose of instructing turkey graders, and a number of men were qualified for turkey grading. The interest in United States standards and grades for eggs at points in the various States continues strong. Numerous requests have been received for material describing and demonstrating these grades, and actual demonstrations have been made in a number of States.

MARKET NEWS SERVICE

Milk and cream market reports have been inaugurated at Philadelphia. These reports will be similar to those issued at New York except that since over 50 per cent of all of the milk received at Philadelphia comes by motor truck, special arrangements have been made direct with the milk dealers to obtain information regarding the quantities of milk received at Philadelphia by trucks. These reports show the State in which all shipments, truck and rail, originated, and in the case of cream they are proving to be of considerable interest in showing sources of supply.

A live-poultry market report has been inaugurated at Chicago. This report shows receipts of live poultry by States of origin, cars on track each morning, cars unloaded each day, and the percentage make-up of cars. The latter information is obtained at New York through the cooperation of the live-poultry inspectors, but at Chicago it is necessary to obtain such information directly from the receivers.

A branch office was opened at Los Angeles during the year, this office being in charge of a representative who handles joint grading and market-news service work. The information collected at Los Angeles relates entirely to the market receipts, storage movements, and miscellaneous information secured from trade sources, but does not include price reporting.

The car-lot egg-shipment report has been extended to include Utah and Idaho, as well as California, Washington, and Oregon. The arrangements with the transportation agencies provide for a weekly report showing the number of cars shipped, the shipping point, and the destination.

A monthly egg and poultry market report has been issued beginning with January, 1929. It contains a discussion of egg and poultry markets and the cold-storage movements, and market receipts of eggs and poultry this year and in previous years are graphically shown. The report contains information regarding imports and exports, and each month a paragraph gives information of current interest and importance.

A new project regarding hatcheries was undertaken during the spring of 1929. The purpose was to gather information regarding the capacity of commercial hatcheries in the United States, the number of eggs set each month, and the number of salable chicks hatched each month. Such information will be of value in measuring the poultry population from year to year and in forecasting probable egg production.

Changes which have been occurring in the dairy industry for several years, such as expansion of direct merchandising and large mergers that have reduced the quantity of open wholesale trading, have brought the decision that the work in Wisconsin can be handled as successfully from Chicago as from Plymouth. The discontinuance of the office will cause no change in the type of service, except the discontinuance of wholesale prices at primary markets.

DIVISION OF HAY, FEED, AND SEED

W. A. WHEELER, *in charge*

SEED-VERIFICATION SERVICE

The seed-verification service will complete its second year of operation in October, 1929. The service has been limited to alfalfa seed during the past year, but following the Seed-Verification Conference in Chicago in June, it was agreed to include red clover, as it has been found that a large quantity of the seed sown in certain sections is giving poor results because it is not adapted to the climatic conditions of such sections.

Much publicity has been given this service by various agencies and an increased demand for verified-origin

seed has been noted in many sections where verified-origin dealers and agronomists of State institutions have advertised the service and stressed the importance of the buyer's knowing the origin of his seed. Certificates covering approximately 31,000,000 pounds of alfalfa were issued during the year.

This service has made it possible for a farmer to obtain alfalfa seed of the desired origin at little or no advance in price. More than 85 per cent of the alfalfa seed sold is handled by verified-origin dealers. It has brought about the keeping of better records by seedsmen, and will tend to eliminate dealers whose records are inadequate. It has tended to discourage the mixing of seed from one State with that from another State and has increased the premiums paid for hardy and adapted seed. It is believed that fairer competition will be brought about and dishonest practices greatly reduced.

SEED-REPORTING SERVICE

During the year 190,000 mimeographed copies of seed reports were issued and distributed to growers, country shippers, seedsmen, consumers, newspapers in seed-producing districts, agricultural periodicals, and others, by the seed-reporting service. The four main types of seed reports covered situation, price and movement, shipment, and weekly seed reviews.

Situation reports were based on information obtained from approximately 8,000 country shippers and 30,000 growers, which was supplemented by that obtained from State agricultural statisticians and by personal visits to seed-producing districts. Foreign information was acquired through contact with foreign correspondents.

Other reports such as prospective seed demand, retail seed prices, retail seed sales, and certified seed-potato production were issued. Special reports and services covering vetch, ryegrass, and sunflower seed were issued. Demand for special service was greater than usual and included the preparation of magazine and newspaper articles, radio talks, the assembly of data and other information for use in conferences with other bureaus, departments, governmental agencies, and commercial associations, largely with respect to tariff revision, weed control, seed production, and marketing.

The seed-reporting service was again of assistance to the Red Cross in locating seed supplies for storm-swept areas.

HAY STANDARDIZATION

A special campaign of educational work has been conducted on the methods of harvesting, baling, and storing necessary to the production of high-grade alfalfa hay. Farmers' Bulletin No. 1539, High-Grade Alfalfa Hay: Methods of Production, Baling, and Loading for Market was prepared and distributed among producers and shippers of alfalfa hay in the most important alfalfa-producing States.

Hay-grading demonstrations have been held before producers, dealers, and feeders of hay, at many points throughout the hay-producing States. In cooperation with the Chicago International Livestock Show and various State colleges, a hay-judging contest was held in connection with the Chicago show, and instructions given to college students and others on the Federal grades. A contest was held for colleges in Western States, and an exhibit was made at the Pacific International Livestock Exhibition. An exceptionally large number of type samples of hay were prepared for the use of State workers, shipping associations, and hay-exchanges in demonstrating the United States standards.

Work has been continued on the measurements of hay in stacks for the purpose of formulating rules for determining the volume of hay in stacks and the number of cubic feet of hay necessary to make a ton. Since large quantities of alfalfa hay in the Western States are sold in the stack, accurate rules for determining the number of tons in such stacks are of great importance. During the last two seasons data have been obtained from 2,461 stacks, and these data are being tabulated and analyzed. This study will be completed as soon as possible.

Definite progress has been made in developing new equipment for measuring color of hay. The use of artificial light, methods of handling samples, and methods of making color readings have been studied thoroughly. New equipment is being developed which is more simple to operate and more accurate in its readings than that previously employed.

ALFALFA-MEAL STUDIES

A preliminary field survey has been made for the purpose of laying the foundation for the preparation of al-

falfa-meal standards. A representative of the bureau visited a number of the important markets and grinding centers and held conferences with reference to the grading factors and inspection methods wanted by the trade. Extensive laboratory research will be necessary before standards can be established.

SOYBEAN HAY STANDARDS

Following a period of research work on soybean hay, conducted in cooperation with the Alabama Polytechnic Institute and the Alabama Farm Bureau Federation, hearings were held, and tentative United States standards for soybean hay were promulgated. This work has been of great interest throughout the soybean-producing area. The United States standards have been adopted as the official standards in Alabama and are being used at important terminal markets for this product.

BEAN STANDARDIZATION

A check has been made of samples of beans from lots sold under commercial standards which indicates a need for a wider use of United States standards and closer Federal supervision of inspection. At the request of various growers' associations and others, brief circulars have been prepared explaining the grading factors and showing the advantage to be obtained through the use of the United States standards as a basis for contracts for the sale of beans. These have been given wide circulation among both bean growers and dealers.

Tentative standards were issued for butternut beans, effective October, 1928. These standards have been used as a basis for inspections in Idaho and have been found satisfactory. After another year's trial they will be made a part of the United States standards for beans.

INSPECTION SERVICE

The inspection service on hay and beans showed a normal increase during the year. Because of a short crop, broomcorn moved to market quickly, and there was only a small demand for inspections. During the year six new agreements for inspection work in cooperation with States or commercial organizations were entered into, and four additional agreements are under consideration. The work of training inspectors for the War De-

partment has continued, and a larger number of commercial inspectors have been licensed than in previous years. Very few complaints or appeals from grades assigned by licensed inspectors have been received. The inspection service has continued to serve as a means for suggesting improvements in marketing methods and practices. Assistance has been given to State officials in drafting legislation relating to the inspection service.

A marked increase in the number of soybean inspections resulted from the placing of contracts for soybeans by large crushers in Illinois on the basis of the United States No. 2 grade. During the year, Peoria, Ill., has developed into the largest receiving market for soybeans in the United States. All receipts at this point were federally inspected.

Feeds, MARKET-NEWS SERVICE

The market-news service on grain, hay, and feed has been expanded. New offices have been opened at Portland, Oreg., San Francisco, and Los Angeles; the offices in California are operated in cooperation with the State. This makes the service more nearly national in scope since the organization now covers all the important grain and hay producing areas. Previous to this year, the service was confined largely to the East and Middle West. Information was available to the Pacific coast before these offices were opened, but the service did not cover the coast completely. With the new offices it will be possible to extend to the agricultural interests of the Pacific coast comprehensive information relative to the market situation in that section on grain, hay, and feeds.

Another important development was the inauguration of a market-news service on rice for the growers of Arkansas, Louisiana, and Texas. This service is now providing weekly information relative to the market situation on both rough and cleaned rice, and plans are being made for the collection and compilation of statistics relative to stocks and movement of rough and cleaned rice, which will enable the bureau to provide the growers with a monthly statement of movement and supply. Such information will help growers in developing a marketing program. The service has been favorably received by the rice growers. The manager of the largest association of growers in the South has stated that the market information was helpful to them and has sent an earnest

request to the bureau that the service be enlarged and continued. Plans for the coming year provide for a sufficient enlargement to cover all the rice-growing areas of the United States. It is hoped to provide more information relative to the supply and demand of rice in competing countries.

The news service on broomcorn was enlarged to cover the principal broomcorn-growing districts and to include a report on the market situation at all important markets. Weekly reviews were issued during the principal marketing season and monthly reviews during the winter and spring when movement was light.

DIVISION OF WAREHOUSING

H. S. YOHE, *in charge*

There has been a continued increase in licensed cotton-storage capacity. On July 22, 1929, this figure reached 3,760,500 bales. Through these licensed warehouses approximately one-half the total cotton crop is handled. Some of the largest cotton warehouses of the world are under Federal license, among them being the public warehouses at Memphis and New Orleans.

A moderate increase was made in licensed space for storing grain, the total capacity being approximately 36,370,000 bushels on July 22, 1929. In connection with the grain work a terminal elevator with 1,200,000 bushels capacity was licensed at Omaha, Nebr. A wool warehouse at Columbus, Ohio, having a capacity of about 4,875,000 pounds of wool, was licensed. This warehouse serves the wool-marketing agencies of the Ohio, Indiana, and Michigan farm bureaus.

The number of warehouses storing tobacco, canned foods, and other products remains about the same as during the previous year. The largest tobacco storage in the country is operating under the Federal warehouse act. Warehousemen storing canned foods have rendered a real service to their patrons. Without exception, canners who have used the warehouse act have been outspoken in their praise of this service.

The placing of cold-pack fruit on the eligible list for storage under the warehouse act has resulted in serving to a high degree the packers of berries in the Northwest, particularly the cooperative associations. Licensed capacity for handling this commodity has more than doubled during the year.

INSTALLATION OF GRAIN-REGISTRATION SYSTEM

Early in June, 1929, arrangements were made in cooperation with the Enid Board of Trade for registering through a registrar, responsible to the department, all grain entering certain licensed elevators at Enid, Okla. This system was installed so as to make the grain paper originating at that point acceptable for rediscount to the Federal reserve bank serving that district. Through this arrangement the local banks are enabled to finance more adequately the grain producers and dealers of that section.

CANNED-FOOD STANDARDS

Standardization work for canned vegetables was continued during the year. The tentative standards for canned peas, corn, and tomatoes were further improved. The Wisconsin Bureau of Markets adopted the tentative standards for canned peas as official State standards, and more than 50 per cent of the peas packed in Wisconsin last year and this year are packed in accordance with those standards. Many canners are experimenting with the grades developed under those standards. Further work was done in connection with the standards for canned spinach, string beans, lima beans, succotash, and pumpkin. These standards will be further improved, although at this time they are being used by many canners.

DEMAND FOR ADDITIONAL PRODUCTS

During the past year requests continued to come to the department to place additional products on the list of commodities eligible for storage in federally licensed warehouses. Among these were alfalfa seed, English walnuts, filberts, pecans, cherries processed in sulphur and brine, and raw apples. Preliminary consideration and investigation have been given to some of these products.

DIVISION OF STATISTICAL AND HISTORICAL RESEARCH

O. C. STINE, *in charge*

FOREIGN COMPETITION AND DEMAND

Information relating to foreign crop and market conditions is now being collected annually through the established offices of the Department of Agriculture in foreign countries, the Consular Service of the Department of

State, the foreign service of the Department of Commerce, and the International Institute of Agriculture. An exchange of information directly with governments and with private agencies adds materially to the information collected through the above channels. The Consular Service contributes timely cables on shipments to the United States, crop prospects, stocks at important points, prices, and other important information about the markets, and more extensive written reports concerning crop and market conditions. In the past year Consular Reports have averaged more than 600 per month, making a total of nearly 7,500 reports for the year. The foreign-service officers of the Department of Commerce also have contributed information as to agricultural conditions in foreign countries, stocks, and particularly economic conditions affecting the demand for agricultural products.

Producers in the United States need information about the production in foreign countries and the demand in foreign markets as a basis for planning the production and marketing of their products. It is also obvious that they need the information as to the probable outturn of production and probable demand as early in the season as possible. The data obtained are combined with the crop and market reports of the bureau and are given wide dissemination. Some progress has been made in checking the early official forecasts and in making forecasts in advance of official forecasts, but much more can be done. Very little has been done in measuring or forecasting demand, and much needs to be done in this field.

Particular attention has been given to the publication of information on the prospects of the wheat crops in Canada, Argentina, and other important wheat-producing countries. The relation of fall and winter climatic conditions to yields was analyzed for the Canadian crop, and these conditions were found to be important in determining probable yields. Significant facts were published in advance of the harvest with regard to probable yield of wheat in foreign countries, which have been of benefit to American farmers in marketing their crop.

Recognizing that durum wheat has a special foreign market, an analysis has been made of durum wheat production and prices. All available data have been collected as the basis for estimating the production of durum wheat in foreign countries. An analy-

sis has been made of the relation of production to prices, and a better basis has been developed for forecasting the demand for durum wheat.

The foreign market reporting service has been expanded along several lines. Special efforts have been made to improve the reporting service on wool. The American consul stationed at Bradford, England, spent some time in the bureau learning its needs for information. The result was a reorganization of the reporting from that station. Arrangements were made with the bureau's London office for cabling additional information including prices; quantities of wool, tops, and yarns passing through conditioning houses at Bradford; and exports and imports of wool and wool manufactures. Similar information is being obtained from continental European countries through the Berlin office. The consul at Tientsin, China, in accordance with arrangements made by the bureau's representative, cables arrivals, stocks at important points, condition of transportation facilities, prices, declared exports, and other significant information about the Chinese market. A beginning has been made also at collecting and distributing information concerning carpet wool in other parts of the world.

Producers who have had to meet competition with products from the Mediterranean Basin have asked for additional information. The North Pacific Nut Growers' Cooperative Association asked for a special report on filberts, to be used in planning the marketing of the present crop. Consuls at Tarragona, Barcelona, Naples, Messina, Palmero, and Constantinople responded promptly to requests for information and reported stocks, prospective supplies, and prices. The walnut growers needed more information from the Orient. The agricultural commissioner canvassed the situation and arranged for reports on stocks and prices from Tientsin. In the course of the year additional information was supplied to almond and prune growers.

The bureau sent a specialist in dried-fruit production and marketing to Europe to study the factors affecting the market for American dried fruit, particularly prunes, in Europe and the trend of competition in European producing areas. Both the Washington staff and the Berlin and London offices of the foreign service have worked closely with the investigator on this project. The Yugoslav prune-producing districts were visited, and the contacts thus made have proved valuable

to the Berlin office in reporting on the Yugoslav crop. Important changes have taken place in Yugoslav prune production since 1925, when a survey was made by this bureau. The investigation of the past year disclosed these changes and provides a valuable picture of the competitive position of the Yugoslav prune industry.

A new service on honey has been inaugurated, since the foreign market has become important to honey producers in the mountain and Pacific Coast States. Plans are being developed to provide these producers as much information as possible with respect to European markets.

A beginning has been made for providing more adequate service on bean production in foreign countries. Data have been collected as to production in important producing countries. Records of imports and exports have been compiled. Basic reports on bean production and marketing were obtained from consular officers in the principal foreign bean-producing countries. Some much-needed information on the competitive influence of different kinds of foreign beans on the various American beans has been obtained. Arrangements have been made with consuls for regular reports on production and market conditions in important centers in foreign countries.

The California market-news service has called for information concerning foreign production and foreign market conditions that affect the marketing of the many different agricultural commodities of that State. In many cases these requests have required an expansion of the bureau's Information service. A large number of California producers have been reached directly or indirectly through this service as well as many producers in other States.

Studies of foreign competition and its effect upon the demand for pork products have been continued. It is of interest to note that in the past few months there has been a strong demand for pork products owing to reductions in the production of pork in several north European countries. This was anticipated by this bureau. There is now evidence of a tendency to increase production. It is obvious that the pork-production cycle in northern Europe is fairly closely in line with the cycle in the United States and that the demand for pork from the United States in north European markets will meet increasing competition within the next 18 months.

A decline in the foreign demand for cotton in the latter half of the year

considerably reduced the exports of American cotton and probably was a factor in causing a decline in cotton prices in the latter part of the year. The Berlin office has kept the bureau informed of the manufacturing activity and of the demand for goods in many continental European countries throughout the season. From these reports the decline in the demand could be anticipated by American producers. The Shanghai office has furnished information on conditions in the Orient. The depressing influence of a larger Indian crop and of declining demand in central European countries has been partly offset by increased consumption in the Orient.

The greatest need for improvement in marketing American apples abroad now appears to be in regulating shipment so as to avoid gluts. An analysis of the effect of heavy shipments upon prices is being made to show producers and shippers the losses that result from a failure to distribute their shipments evenly and in relation to the demand for apples.

The foreign-service section has assisted in the preparation of outlook and price-situation reports and has prepared during the year 375 press releases, 360 foreign-service reports, and 52 issues of Foreign Crops and Markets. The mailing lists of the special foreign-service reports contain over 8,000 names and the Foreign Crops and Markets mailing list over 2,600 names. Both the special foreign-service reports and Foreign Crops and Markets are extensively republished in newspapers and used by State agricultural economists and statisticians. Farmers and farm leaders are appreciating more and more the value of information relative to foreign competition and demand, and their demands for this service are increasing.

AGRICULTURAL-OUTLOOK STUDIES

An increase in funds has made possible an expansion in collecting and analyzing data for use in the preparation of production and marketing programs. A beginning has been made in studies of factors affecting the prices of stocker and feeder cattle as a basis for aiding cattle feeders to plan their business so as to avoid losses. This becomes particularly important at the present phase of the cattle cycle. Prices have risen to a high point, and while they were rising it was easy to make money feeding cattle and there was but little chance of losing. Now with the prospect of increasing cattle

production and lower prices within a few years, feeders are facing some difficult situations and need a better basis for judging what price they can afford to pay for feeders, or what they can expect to obtain for the fed cattle when they are ready for market. A similar analysis of lamb prices has also been begun. Hog prices have received much attention, but there are still important points to be investigated, and some attention is being given to developing more accurate estimates of the probable supplies of hogs.

A beginning has been made in the analysis of egg prices. The relation of egg receipts to prices has been studied. Preliminary results have been used in the first midsummer outlook report on eggs and poultry and in the preparation of egg price situation reports, which began in April.

Rice is another commodity upon which little research work has been done in preparation for outlook reports. Much information has been gathered as to the production, distribution, and prices of rice and the most important factors influencing prices have been determined. The analysis has not been completed, but enough work has been done to provide a much better basis for planning both the marketing and production of rice.

PRICE ANALYSIS

Analyses of the prices of farm products have been continued. Additional work has been done on corn, oats, and wheat. The results of the analyses have been used in the monthly price situation reports. Study of corn prices has included the determination of the average level of corn prices for the crop year and the intraseasonal changes. It has been found possible to ascertain fairly accurately the December price of corn and the change from December to May. Oat prices are being studied in relation to the prices of other feedstuffs. Some time has been devoted to revising the formula for estimating the May price of wheat. Studies have been made of the relation of world supplies of wheat to world market prices and the relation of the supplies of the different classes of wheat in the United States to world market prices and to the prices of other wheats in this country. These studies will develop the basis for determining the general level in seasonal movement of prices for the different classes of wheat in the United States.

The analysis of apple prices has been continued, and the results are being

utilized in the preparation of monthly price-situation reports. Work on potato prices has been inaugurated.

Progress has been made in the collecting of data and in the making of a preliminary analysis of wool prices. The course of prices of cotton during the past season will be reviewed to show what factors have influenced the price level and the price changes.

A project dealing with factors that determine the price of butter was begun some time ago at the University of Minnesota and is being continued in Washington. An analysis has been made of the factors affecting the number of milk cows in different States as a factor in determining butter production. A study of the probability of expanding the dairy industry in the different States has been begun. The relation of pasture conditions to summer production and feed prices to winter production has been analyzed. It is hoped that these studies will be completed for publication in the coming year.

A study of the factors affecting the consumption of dairy products was undertaken in cooperation with the New Jersey experiment station. An enumeration of the consumption and production of dairy products in six selected townships in northern New Jersey has been completed. The purpose of this enumeration was to find first of all the per capita consumption of dairy products in different forms under different conditions. These per capita consumption data will be useful in estimating both the production and consumption of dairy products throughout the country. A survey was made of the consumption of dairy products in Jersey City. The object was to ascertain the effect of variations in racial characteristics, composition of the family, income, and other measures of living conditions upon the consumption of dairy products.

A study is being made of the causes of variations in the demand for dairy products in New York City through collecting data on sales by chain stores in different parts of the city, and relating these sales to income and nationality groups.

MONTHLY PRICE-SITUATION REPORTS

The price-situation reports of the bureau have been improved both by increasing the number of commodities dealt with and by making a more critical analysis of the different commodities. A review of forecasts made during the past year shows more

definiteness and a fairly high degree of accuracy in forecasting the prices of most of the commodities two or three months in advance of the report. The mimeographed report was inaugurated primarily for the benefit of State statisticians and economists, who wanted the report promptly for use in preparing monthly State-outlook or price-situation reports. It is evident that the monthly price-situation report is meeting a need for a continuous outlook and price-situation service to supplement the annual and seasonal outlook reports as a basis for planning both production and marketing during the year.

AGRICULTURAL INCOME

Research aiming at improvement in estimates of agricultural income has been continued in cooperation with other divisions of the bureau. Estimates of gross income from production by States have been nearly completed. The next step is to collect data and estimate expenses by States. This will require another year or more of work.

The annual income from farming in the United States during the past season has been estimated in the usual manner. The aggregate gross income for the 1928-29 season is estimated at \$12,527,000,000, an increase of about \$225,000,000, or nearly 2 per cent over the previous year. During the past season producers of livestock and live-stock products have realized better incomes, but wheat and potato growers received less than during the previous season. Expenditures for feed, fertilizer, and machinery during the past season appear to have been a little larger than during the previous season. Consequently the net income and the return on capital has been increased but little.

TRANSPORTATION RESEARCH

A study of the transportation of cotton has been continued. Special problems have been dealt with in response to requests of farmers, farm organizations, and others for information concerning freight rates in relation to agriculture. A study of the effect of changes in freight rates on production and prices has been continued. The purpose is to determine to what extent and under what circumstances farmers pay the freight rate and how the adjustments or changes affect the farmers' income.

TARIFF STUDIES

The proposal to revise the tariff act of 1922 gave rise to the demand for information from this division, the supplying of which required a large amount of work. Many requests have been received for information as to exports, imports, character of competition from foreign countries, tariff duties, and the effect of rates or the probable effect of proposed rates upon imports or prices of products. In response to requests, information regarding the production and trade in all important farm products have been tabulated and analyzed in relation to the tariff. For each of the important commodities and groups of commodities a study has been made of the effect of the tariff on imports and prices and the probable effect of changes in duties. Special studies were made in response to specific requests.

HISTORICAL RESEARCH

An agricultural history bibliography has been completed. This carefully selected but comprehensive bibliography will be useful to those engaged in economic research and to other agricultural-research workers. History gives the agricultural student and research worker a better perspective and provides a basis for better judgment in dealing with agricultural problems. The teaching of agricultural history has made but a modest beginning in this country, but it is believed that there will be a rapid development in this field in the next few years.

The collection and analysis of farm prices in Virginia and Maryland over a long period of years has been completed. The results of the Virginia study are in press as a bulletin of the Virginia Agricultural Experiment Station, and the University of Maryland will publish the results of the Maryland study as a station bulletin in cooperation with the Bureau of Agricultural Economics.

DIVISION OF AGRICULTURAL FINANCE

ERIC ENGLUND, *in charge*

AGRICULTURAL CREDIT AND FINANCE

Research in agricultural credit during the past year has developed significant facts concerning the demand for farm credit and means of improving the farmer's credit practice. The importance of the farmer's borrow-

ing operations has been emphasized by results of studies in short-term credit conducted in a number of States and of nation-wide investigations in farm mortgages. These inquiries have shown that approximately 75 per cent of all farms use seasonal credit and that about 37 per cent of farm owners use credit secured by farm mortgage.

Analysis of the factors affecting the demand for credit on individual farms has shown significant relations between farm credit problems on the one hand and size of farms and systems of farming on the other. Although the amount of short-term credit per farm increases with the size of the farms, the amount per acre decreases under substantially similar conditions of farming. The same relation appears in the field of mortgage credit; the ratio of debt to value of the farms mortgaged decreases with the increase in the value of the farm. For the country as a whole in 1925, mortgaged farms under \$2,500 in value have indebtedness of 50 per cent of their value, while those over \$50,000 in value have debt of only 36 per cent of their value. Further study of demand for credit is in progress.

Studies in farm-credit risk have aimed to determine the causes of the spread between money rates on the central markets and credit costs to the farmer in selected areas. Results show that, despite some poor risks, credit charges to many individual farmers often bear little relation to the danger of loss to the lender, but are more nearly related to the type of institution supplying the credit. One-half of the farmers using credit in some representative areas pay moderate rates on half their short-time credit and four times that amount on the other half.

Studies of merchant credit among cotton, tobacco, and potato growers show that many farmers often fail to realize the high rates of interest they pay on fertilizer and on general supplies bought on time. Thus studies made in the cotton and tobacco areas of North Carolina, South Carolina, and Georgia indicated that fertilizer at time prices generally cost the farmer around 35 per cent interest on an annual basis. Eighty-two credit merchants interviewed in these States and in Arkansas and Oklahoma reported charges which averaged 27 per cent per annum on all credit sales to farmers, and occasionally charges averaged in the neighborhood of 80 per cent per annum. Such rates are not a net gain,

since the losses of these 82 merchants on credit sales to farmers over a 4-year period equaled 15 per cent, leaving a gain per annum of 12 per cent. Thus, this practice is the source of serious waste for those farmers who pay their bills. It tends to subsidize submarginal producers and thus increases the output and thereby lowers the price paid to producers generally. The outlay for credit due to such charges, in excess of cash rates, has been found to be nearly equal to the tenant's annual rate of accumulation.

These facts suggest that farmers should shift their credit operations to a cash basis as far as practicable, and to that end should establish connections with local banks or other cash-lending institutions from which necessary production credit may be borrowed at lower rates of interest.

The year's research has aided in diagnosing various farm-credit difficulties. In the Southern States where local studies have been completed the farmers who use larger amounts of credit and who are usually better risks more often buy on time from the merchants than do farmers who use less credit. This suggests not only a limited lending capacity of local institutions but also that buying on time, despite the high cost of this form of credit, is habitual with many farmers who could avail themselves of cheaper loans. These local money shortages which hamper the farmer's operations are frequently intensified by the retention by banks of large amounts of farm mortgages among their assets. Much of this long-term credit on standard security could be shifted to other agencies specializing in farm mortgages.

Credit studies have shown that the farmer often can effect improvement by better handling of his finances. For example, approximately one-half the credit-using farm owners interviewed in North Carolina had no mortgage credit. By using land as security for long-term loans from sources specializing in farm mortgages, such farmers could obtain, at much reduced rates, ample operating funds which, with careful management between seasons, could be used year after year. This policy would relieve the demand now made on many banks, and leave those agencies in better position to serve emergency needs. The importance of care in using mortgage loans for short-term financing hardly could be overemphasized. Should the borrower yield to the temptation of dissipating these funds for

nonproductive purposes, it clearly would be better not to resort to this type of financing.

It has been found that fluctuations in annual returns to farmers and other variations in local conditions affecting credit institutions are major difficulties for many local banks and credit merchants. Credit corporations in areas studied have been irregular in benefiting the farmer partly because they have not always been formed when credit conditions warranted, or, because they have been discontinued when credit cost to the farmers of the area was still high. A study of agricultural-credit corporations, now in progress, will provide a further basis for evaluating them.

Comprehensive studies of farm-mortgage debt in the United States indicate that from 1920 to 1925 there was an increase in the total volume of farm-mortgage debt on all classes of farms of more than 19¹ per cent over the \$7,857,000,000 estimated in 1920, and a further increase of slightly more than 1 per cent from 1925 to 1928. The estimated total mortgage debt as of January 1, 1925, was \$9,360,000,000, while the debt as of January 1, 1928, is estimated at \$9,468,000,000. During the latter period more farms have been mortgaged but for a slightly reduced proportion of their 1924 value. Since 1924, however, the ratio of debt to current value has increased because of a decline in land values. The probable reasons for these changes will be explained in the full report of these estimates of farm debt.

Data concerning source of loans and their ratio to land value in the various States have furnished material for a new study of the cost of credit. Continuation of this line of research is planned in order to obtain reliable information currently on volume, sources, and cost of farm credit.

Preliminary studies of farmers' investments outside of their farms have shown that few farmers have such investments. Nevertheless these investments and their possibilities are of sufficient importance to warrant careful study. Plans are being made for a research project in this field.

During the year material concerning farm credit has been provided for use in agricultural extension on a number of occasions. Several articles have been contributed to scientific periodicals and farm journals, and a number of radio talks on farm credit have been given.

¹ Preliminary.

AGRICULTURAL INSURANCE

The results of a comprehensive study of farmers' mutual fire insurance were included in Circular No. 54, Developments and Problems of Farmers' Mutual Fire Insurance, published in 1928. This study deals with the outstanding problems and recent developments affecting those mutual companies which limit themselves largely or exclusively to the insurance of farm property. Statistical data were obtained for 1,911 such companies, the combined risks of which amount to approximately \$10,000,000,000. This volume of insurance is sufficient to cover, at three-fourths value, about 52 per cent of all insurable farm property in the United States. Through this form of organization, farmers are obtaining fire insurance at an average cost of about 26 cents per \$100 per year. The study indicates, however, that if the more advanced methods and practices in use by a part of these mutuals were adopted by all the companies in this group, the present moderate cost of such insurance could be further reduced by fully one-half. This study was exceptionally well received by mutual companies, farmers, and the public generally.

Work has been nearly completed on a project which aims to bring up to date the bureau's information on fire prevention and fire protection on the farm. The study deals with control of farm fires from a threefold standpoint; namely, care in construction, maintenance, and use of property with a view to eliminating fires as far as possible; individual or home equipment for the extinguishment of fires discovered in their early stages; and organized rural fire protection including a summary of recent State legislation intended to promote such protection.

Work on the committee on farm fire protection, organized under the auspices of the National Fire Protection Association, has been continued. Two bulletins were prepared by the committee, one of which deals with fire-protective construction on the farm and the second with specifications for equipment for rural fire protection. A number of outstanding problems in fire, windstorm, and crop insurance were outlined and discussed before groups or associations of farmers and their insurance representatives. Special assistance was given in the organization of a State association for reinsurance and other purposes among the farmers' mutual companies of New Hampshire. Additional information has

been gathered on the subject of livestock insurance with a view to the publication of an analytical summary of this form of insurance in the United States.

In accordance with the bureau policy of disseminating widely the results of research, various phases of the results of research in insurance have been included in radio addresses and articles for insurance journals.

FARM TAXATION

The results of six or seven years of research in the problems of farm taxation have been prepared for publication. This study includes work done in cooperation with several States, as well as research carried on independently by agricultural experiment stations.

Total taxes paid by farmers in 1927 were estimated to be \$900,000,000. Taxes for 1928 were 1½ per cent above those of the previous year. Since 1914 farm taxes on land and buildings have increased more than 160 per cent. Thus the average farmer who in 1914 paid about \$40 taxes on his real estate is now paying about \$105.

Income from farm land in those sections in which rented land is common is best measured by the net rent which the landlord receives for his property. Studies have been made in 14 States to ascertain the proportion of net rent which the landlord is compelled to use to pay his taxes. The percentages reported by these studies varied from over 50 per cent in Michigan and New Jersey to less than 20 per cent in Missouri and Arkansas. Nine of the States reported percentages ranging from 25 to 40 per cent. It was estimated on the basis of the data assembled that during the period 1922 to 1927, taxes took about 30 per cent of the net income of rented farms.

A comparison of the relationship between taxes and net cash rent in 1919 and 1924 on farms in 20 counties of 15 States indicated that in 1924 the percentage of net rent taken by taxes was higher than it had been in 1919 in 17 of the counties and lower in 3 counties. The percentages in the individual counties ranged in 1919 from 12 to 31, and in 1924 from 15 to 72.

For the country as a whole in 1924 the tax on each \$100 of actual value of real estate in owner-operated farms averaged \$1.22. In the various States the tax on the same amount of value varied from 71 cents in Florida and 72 cents in Virginia to \$2.07 in New Hampshire. In 26 of the States the

tax was between \$1 and \$1.50 per \$100 of real value. Land values for the country as a whole were, in 1928, 10 per cent lower than they were in 1924, and farm taxes were 5 per cent higher. On the basis of these figures it was estimated that in 1928 farmers paid in taxes \$1.42 per \$100 of actual value of land and buildings.

Several cooperative studies of taxation have been carried on with individual States. The cooperation of this bureau with the tax commission of North Carolina made possible an extended treatment of the taxation of agriculture in the detailed report which the commission published early in 1929. Similar cooperation in an investigation authorized by the Legislature of the State of Iowa resulted in the presentation of a report containing detailed figures concerning the taxation of various types of businesses and properties in that State.

Cooperative research in farm taxation was carried on with the agricultural experiment stations of the States of Virginia, Colorado, Washington, and New Jersey. A report entitled "Some Colorado Tax Problems" was published by the Colorado Agricultural Experiment Station as a result of investigations in that State. Further work directed particularly toward an understanding of the costs of county government and the financing of rural schools is being carried on in Colorado. A bulletin summarizing data relating to the taxation of rural and urban real estate in Virginia is in press. The work in Virginia is being continued in the form of an investigation of certain aspects of local finance. Data secured in both Washington and New Jersey have been tabulated, and detailed reports of results for each of these States are in the process of preparation.

Material relating to farm-tax problems has been supplied to many individuals and groups interested in a serious investigation of the problem. Suggestions have been made to committees of farm organizations in several of the States to assist them in formulating programs of tax reform. The data prepared have been used in speeches before farm and other groups, radio talks, and articles contributed to tax periodicals and farm journals.

DIVISION OF COOPERATIVE MARKETING

CHRIS L. CHRISTENSEN, *in charge*

The Division of Cooperative Marketing was transferred to the Federal Farm Board by Executive order on

October 1, 1929. The following statement covers the activities during the past year under the Bureau of Agricultural Economics.

The principal change in the scope of the work was caused by the increasing demand for assistance of a service nature. Many large cooperatives now make it a practice to consult the division before initiating or modifying any major policies. Consequently, there is an almost constant demand for assistance in formulating financing, operating, and merchandising policies. The trend toward centralization of sales and the federation of several cooperative units also creates demand for assistance in developing organization plans with reference to both the legal and the business set-up of the cooperatives.

Demand for service by cooperatives emphasizes the importance of the research of the division. The need for the collection and analysis of data regarding the organization and operation of cooperatives becomes more apparent as the functions and responsibilities of the associations increase. The service of the division becomes increasingly valuable as its fund of facts becomes greater. Approximately 60 per cent of the work carried on by the division at present may be classed as research, and it is highly desirable that this ratio should be maintained.

RESEARCH STUDIES

Research was continued along the four major lines: (1) Study of the development and problems of cooperative-marketing associations within each major commodity group; (2) business studies of individual cooperative associations which have been operating over a period of years, in which a detailed, critical analysis is made of organization, membership relations, pooling and accounting methods, financing, management policies, and merchandising practices of individual associations, and of the external economic factors wh'ch affect their operations; (3) research in legal phases of cooperative organization, financing of cooperatives, membership relations, and educational methods; and (4) studies of cooperative purchasing of farm supplies.

COOPERATIVE MARKETING OF GRAIN

The study of farmer-owned grain-marketing associations was continued. A preliminary report entitled "The Present Status of Farmer-Owned Grain Marketing Associations in the United

States" presented historical and statistical data regarding farmers' elevators and terminal grain-marketing associations. Unusual interest was aroused by this report, since it brought together for the first time information on all phases of cooperative grain marketing. It has given to those interested the first really comprehensive inventory of their activities. This study has helped to bring about closer cooperation among farmer-owned terminal grain-commission agencies. The report has been widely used by farmers' organizations.

The results of a study of cooperative grain marketing in western Canada were published in Technical Bulletin No. 63, Cooperative Marketing of Grain in Western Canada. Since this was published demands for addresses, written articles, and conferences dealing with Canadian experiences and their possible application to problems in the United States have been numerous. To keep closely informed on the experiences of the cooperative grain marketing associations in Canada, a further brief study was made.

A study of terminal grain markets and marketing organizations was initiated to obtain information for the benefit of cooperative associations. Production and marketing trends in the principal grain areas and States are being analyzed. Information thus obtained will be used in conjunction with data on the practices and policies of terminal grain-marketing organizations to provide a basis for advisory work with cooperative grain-marketing associations.

Research work with farmers' elevators in the spring wheat area was continued. Field work was carried on in cooperation with the States of Minnesota, North Dakota, South Dakota, and Montana, and records were obtained from about 100 farmers' elevator associations covering the 1927-28 marketing season. Data obtained in this study for 1926-27, covering expenses, incomes, and margins, were tabulated, analyzed, and submitted for publication as a preliminary report. Analysis was made of data obtained regarding hedging practices of farmers' elevators, and a report is being prepared.

Members of the staff engaged in research and service work in cooperative grain marketing have been called upon to address a number of conventions, institutes, and meetings and to attend many conferences. The bureau has

been closely identified in an advisory capacity with several groups interested in the federation of cooperative grain-sales agencies and local elevators. The research studies have been of great assistance in providing helpful material.

COOPERATIVE MARKETING OF DAIRY PRODUCTS

The study of the organization and methods of representative fluid-milk marketing associations, and economic analyses of some of the factors affecting the operation of these organizations has been completed. Special attention was given to price plans and policies and to methods of adjusting production to demand.

Cooperative butter and cheese factories have been studied to determine factors affecting their efficiency and the more important factors in their development. Data have been collected and analyzed relative to the factors that affect the success of cooperative creameries. This material is being prepared in such a way as to be of assistance to producers in newer dairy sections. Suggested by-laws have been prepared for the use of those planning cooperative organizations. Emphasis has been given to an explanation and analysis of the factors that determine the type of creamery suitable under the producing conditions and volume existing in different parts of the country.

A study of fluid-milk marketing in the Lake Michigan west shore milk shed, particularly as related to the Chicago and Milwaukee milk sheds, is being carried on in cooperation with the University of Wisconsin. Data are being obtained on the present status, development, and shifts of these milk sheds and on causes of changes, together with transportation developments in this section.

Special attention has been given to the marketing of fluid milk, cheese, and butter. A survey has been made of 200 cheese factories in Wisconsin to determine their methods of operation and their costs. The study will cover also shifts of the cheese industry within the State because of the expansion of the Chicago milk shed and increased shipments of cream to eastern markets.

COOPERATIVE MARKETING OF LIVESTOCK

A survey of local livestock-shipping associations has been completed. An analysis has been made of the factors

that affect the operating efficiency of local livestock-shipping associations in the trade territory of the Indianapolis market. The purpose was to determine the factors and economic forces which have compelled local livestock-shipping associations to change their operating policies and practices and which have disrupted and destroyed shipping associations in Indiana and Illinois, particularly with regard to the competition which associations have experienced from commercial trucking and from direct-buying operations by packers. Special attention was given to the influence of interurban shipping, improved roads, and small markets on livestock-shipping associations. It is hoped that it will be possible to set up definite standards of efficiency for local livestock-shipping associations.

Service work with livestock cooperatives has included advice and assistance to the associations in working out their policies and programs and in the formulation of plans for organization or other undertakings; in preparing or criticizing special articles and other material for publication by the livestock journals and the associations; and in presentation of the work before directors and officials of cooperative associations, cooperative-marketing schools, and other meetings.

COOPERATIVE MARKETING OF COTTON

A conference was held with representatives of cotton cooperatives at Memphis, Tenn., for the purpose of discussing the cooperative cotton-marketing situation. Representatives from the 14 large-scale cotton cooperatives were present, and it was unanimously agreed that much good resulted from the exchange of experiences. An agreement was reached on 10 economic services that cotton cooperatives can advantageously perform for the grower. This is significant in that it indicates a greater consciousness with respect to the real functions of cooperative marketing. A request was made that this bureau make a comprehensive survey and analysis of the historical development, accomplishments and shortcomings, policies, and practices of each cotton cooperative.

A broad program of research has been undertaken in response to this request, covering (1) a detailed analysis of the policies and functional operations of each association; (2) membership studies for the purpose of analyzing the attitude of members, nonmembers, and opinion-making agencies as to serv-

ices rendered by and expected of the associations; (3) a study of cooperative processing, especially ginning and oil milling as practiced by cotton cooperatives through subsidiary corporations; (4) an analysis of the operations of subsidiary finance corporations engaged in making production loans to members; and (5) an analysis of the experiences of the associations in purchasing production supplies as well as an investigation of the economic opportunity for expansion in this field by cotton cooperatives.

As a result of this research the bureau will not only be able to make concrete suggestions and recommendations as to desirable changes in organizations and operating practices but through intimate acquaintance with the various problems of cotton cooperatives will be in an excellent position to develop a long-time service program with the cotton associations.

COOPERATIVE MARKETING OF EGGS AND POULTRY

A general survey of cooperative egg and poultry marketing associations was begun. The survey will include a brief history of progress in cooperative marketing of eggs and poultry, and a classification of the different types of egg and poultry cooperatives that have been developed under varying conditions; an analysis of the problems of cooperative organizations, and of the business organization, physical set-up, legal relationship, and practices related to these problems, and a summary of accomplishments in this field of marketing. As the conditions under which cooperatives operate are determined largely by the conditions of production which are found in a particular section, the survey will aim to disclose what relationship exists between the conditions of production and the policies and methods of cooperative-marketing associations.

At the request of cooperative-marketing associations and extension workers in the Northwestern States, a survey of the methods of marketing turkeys was begun which is designed to show which of the various marketing practices employed is likely to yield the most satisfactory results to producers.

COOPERATIVE MARKETING OF WOOL

The marketing of wool in Australia, New Zealand, the Union of South Africa, England, and France was studied in 1927 and 1928 by a representative of this bureau, at the request

of some 30 cooperative associations marketing wool. The findings resulting from this survey have been presented in Technical Bulletin No. 124, Some Factors Affecting the Marketing of Wool in Australia, New Zealand, the Union of South Africa, England, and France. They have also been presented before numerous meetings of wool producers in the United States.

COOPERATIVE MARKETING OF HONEY

The study of the cooperative marketing of honey, begun in 1927, in co-operation with the New York State College of Agriculture, was completed and the principal findings prepared for publication.

COOPERATIVE MARKETING OF FRUITS AND VEGETABLES

A study was begun of the marketing practices of cooperative associations handling eastern grapes and of outlets and market demand for grapes produced in the eastern United States. This study includes a survey of retailers and consumers to obtain information regarding the demand for eastern grapes and preferences with regard to varieties and types of containers. It will be followed by a study of grading, handling, and marketing methods at country points to ascertain the extent to which the cooperative associations and other shippers are meeting market demands. A study was begun of the organization and operation of cooperative associations canning fruits and vegetables in western Oregon and Washington.

COOPERATIVE BUSINESS ANALYSIS

Findings of the business analysis of the Rice Growers Association of California were put into operation for rice producers of Texas and Louisiana through the American Rice Growers Cooperative Association. At the request of the board of directors of the latter association, a survey of the operations of the association was made during 1928. The resulting recommendations were adopted and put into practice in time for the marketing of the 1928 crop. Important amendments were made to the charter and by-laws, and a number of changes were made in the growers' marketing agreements.

A rough-rice grading laboratory was established, and Federal-State grading of rough rice was inaugurated. A comprehensive market-news service

was also developed, which gives the growers weekly unbiased facts concerning the prevailing prices of rough rice throughout the rice belt, on the basis of definite grades. These services are carried on in cooperation with other divisions of this bureau.

A study of the Hastings Potato Growers Association, of Hastings, Fla., was made at the request of the board of directors of the association. Records regarding its various phases of operation, such as purchasing, financing, and selling were obtained, and interviews were had with about 60 per cent of the active members to determine their attitudes toward the association and their opinions regarding its operation and management. A preliminary report was made to the board of directors of the association, that they might have the benefit of the available results of analysis during the 1929 marketing season. Following this report, further analysis of the data was made, and additional information regarding the marketing of the association's commodity was obtained by interviewing representative members of the trade in three important markets. A final report was made to the board in June, 1929, and it is intended to prepare the results of the study for publication.

A study was made of the business of the Washington Shipping Association, Washington, Ind., at the request of its board of directors. An analysis was made of the organization, operating practices, and accomplishments of this successful cooperative enterprise. Attention was given particularly to membership performance, an analysis of sales methods and results, and to the methods of handling livestock. The results of this study will be made available for the use of other groups contemplating organization along similar lines.

A complete survey and analysis of the business policies and practices of the Utah Poultry Producers Cooperative Association, its relations with its members and customers, its economic problems, and operating policies as influenced by its environment, has been undertaken at the request of the board of directors of that association and the Utah State Agricultural College. The findings of the economic study of the Poultry Producers of Central California, completed in 1928, are being prepared for publication.

The study of the Producers Live Stock Commission Association of National Stock Yards (East St. Louis),

was completed and the results prepared for publication as a Circular 86, A Business Analysis of the Producers Live Stock Commission Association, National Stock Yards, Ill.

MEMBERSHIP RELATIONS AND FIELD SERVICE PROBLEMS

Three research projects in membership relations were instituted, two of which have been completed. These are a study of membership relations in the Hastings Potato Growers Cooperative Association in connection with a business analysis study of this association. The other was made for the California Walnut Growers Cooperative Association at the request of the general manager. The findings of the study of the Hastings Potato Growers Association were incorporated in the business analysis of that organization. Results of the study of the California Walnut Growers Association were reported to the board of directors, at which time suggestions were made for improving the conditions in membership relations and for a long-time educational program.

Membership relations and field-service problems of seven of the large cotton cooperative associations are now being surveyed. Some of the data collected from two of the States will be used as material for a service project in assisting at least two of the associations to set up means and methods of improving membership relations in their organizations prior to receiving the 1929 cotton crop.

Results of a study which was made of membership relations in the Prune and Apricot Growers Association were used in an educational campaign preliminary to the reorganization of that association.

LEGAL PHASES OF COOPERATION

Assistance has been given in the preparation of articles of incorporation, by-laws, marketing contracts, and other legal papers employed by cooperative associations. Many problems and questions of a legal nature have received attention both in Washington and in the field. Work has been done on legal questions incident to the economic and business study of the cotton-cooperative associations and a business analysis study of a tobacco association. This has involved an analytical study of the organization papers, operating methods, and cooperative statutes applicable to the vari-

ous associations. Numerous articles based on current decisions of the courts involving cooperative associations, have been prepared for publication in Agricultural Cooperation. Department Bulletin No. 1106, Legal Phases of Cooperative Associations has been revised and brought up to date by the addition of a discussion of recent important statutes and court decisions affecting the cooperative movement. This bulletin has served as a guide to many groups of farmers contemplating organization.

EDUCATION AND EXTENSION IN COOPERATIVE MARKETING

Work has been done in assisting cooperative-marketing associations, cooperative extension officials, and college departments of agricultural economics in planning and carrying out programs of extension and marketing research. The extension and cooperative-marketing officials are particularly interested in short-time research projects, the results of which can be made available by the agencies conducting the studies before it is possible to have a complete report published. This type of research is of great assistance to the cooperative-marketing officials in planning their sales policies and is of benefit to cooperative associations and extension officials in developing production programs.

Eight cooperative-marketing schools were held during the fiscal year 1928-29. These schools were conducted by the State colleges of agriculture and extension services in all States except Mississippi, where the cooperative council, which is composed of representatives from the agricultural college, the cooperative-marketing associations, the State department of markets, and other educational agencies of the State, took the initiative. In all schools the cooperative associations have given their support by taking part in the program and by having their directors and their field and office employees in attendance.

Articles have been prepared for newspapers, farm papers, and magazines upon request. Short talks have been delivered by members of the division over the radio. Assistance has been given to cooperative associations in the preparation of such educational material, as lantern slides, lectures, motion-picture films, and exhibits.

One of the most effective methods of extending market information has

been by conferences with groups of State marketing specialists. An example is the cooperative extension conference of marketing specialists of the North Central States, which was held at Purdue University, Lafayette, Ind. At this conference, this bureau cooperated with State and Federal directors of extension and State extension marketing specialists in outlining a definite procedure for coordinating the State programs of extension, marketing, research, farm-management, and production specialists.

HISTORY AND STATISTICS OF COOPERATION

A survey of cooperation was made in which reports were collected from about 8,000 of the 11,400 active associations of which the division has record, and the data obtained tabulated by commodities and States. Significant information regarding the activities of the large-scale associations was also collected and arranged to show present trends in the cooperative movement. From this material a manuscript has been prepared for publication.

In cooperation with the extension service of the department, information regarding the cooperatives in those counties which have county agents was obtained. At the same time many county agents were supplied, in response to specific requests, with information regarding various phases of the present cooperative movement.

DIVISION OF FARM POPULATION AND RURAL LIFE

C. J. GALPIN, *in charge*

Twenty-eight projects have been carried on during the year in cooperation with State agencies, the State work being financed largely from Purnell Act funds. Between \$90,000 and \$100,000 of the funds provided under the Purnell Act were allocated to sociological research at the experiment stations of 25 States for the past fiscal year. The Division of Farm Population and Rural Life has cooperated to some extent in nearly all of the research projects of this character carried on under this act. These projects covered such studies as the composition and changes in rural population, rural community organizations, social aspects of farmers' local municipalities, and movement of population to and from farms. Eight bulletins were published during the year as well as a quarterly mimeographed report on farm population and rural-life activities, a directory of teachers of rural

sociology, and numerous mimeographed releases on various phases of the work.

SOCIOLOGICAL-RESEARCH PROGRAM

The division has assisted the Social Science Research Council in the preparation of a monograph report on the subject of extension projects of a rural sociological character in relation to research studies. This report considers critically the type of sociological extension work being carried on and points out the necessity for a more thoroughgoing sociological selection of projects.

It is realized that no one has at any time underrated the importance of the population side of agriculture; but the complexity of the purely human phases of agricultural life has seemed to many economists to offer a well-nigh insuperable obstacle to precise investigation and research, thus rendering a scientific body of knowledge in this particular impracticable. The work of this division, however, has helped to convince economists and the public generally that the human-relationships factor in agriculture, especially in its larger collective respects, is amenable to scientific analysis and to illuminating interpretation.

SHIFTS IN FARM POPULATION

The 1928 survey of the movement of population to and from farms indicates that the farm population is still on the whole slightly declining in absolute numbers. The usual interpretation of this phenomenon is that the decrease is due largely, if not wholly, to the release of farm laborers to cities by reason of power farming. It should be noted, however, that increased mechanical efficiency has not only released labor, but that increased scientific management, reducing costs, has driven out the ineffective farm operator who, unable to adapt his practices to new ways of agriculture, could not meet costs and so left the occupation. The future seems to hold in store a régime of scientific farming. Those farmers who remain will either conform to science in their practice or drop to a low standard of living, eking out a small return from farming by labor in other directions as opportunity permits.

RURAL-POPULATION ANALYSIS

An analysis of the rural population of New York State from the year 1855 to 1925, made at Cornell University

in cooperation with this division, illustrates how research in the field of population statistics has definitely added to the body of farm-population knowledge. Precise knowledge on the decrease of farm population in counties of low density, increase of village population in certain periods of farmer prosperity, decrease at other periods, and increase of rural population in counties of high density—all throw light upon the economic problems of the farm and show the specific effects in the country districts of city growth out of country recruits.

STANDARDS OF LIVING

A study of standards of farm family living in Laurel County, Ky., one of the so-called mountain counties, shows a range of annual living expenditures among 203 families from \$214 to \$1,946, with an average of \$689, which is considerably lower than the average living costs among over 3,000 families studied before in various States. The outstanding phenomenon in this study is that 35.5 per cent of the families received other income than that from farming. Local industries helped out farming in this county. An Ohio study made last year showed a similar fact. The characteristics of the farms in both studies are poor soil, difficult topography, small farms, little tillable land. A fair hypothesis is suggested by these studies—that 40 per cent of the farm population of the United States is living on farms of this general character, which limits the family at present to a low standard of living, even with outside sources of income amounting to a considerable sum. These studies of standards of living raise the question whether agriculture must not face a permanent condition of having a large percentage of part-time farmers, progress in whose living conditions must include a program of establishment of rural industries as well as a special type of farm management.

TOWN-COUNTRY RELATIONS

Cooperative studies of relationships between town and country have been undertaken in several States. These studies try to find out what types of services farmers' towns of various sizes can successfully render to their respective trade areas. They likewise seek a greater understanding of the farmers' trading habits and the relation of these to the social institutions and agencies with which they main-

tain contacts. The findings of such research projects also have a very real bearing upon rural organization for any purpose, economic or social, when effective local groups of farmers or farmers and townspeople are to be established.

PROBLEMS IN COOPERATIVE MARKETING

A study of 350 local farmer organizations in Wisconsin indicates that rural organizations pass through definite life cycles—stimulation, rise, carrying-on, decline. A period of crisis comes between the fourth and seventh years. Organizations concerned with business activities live longest. Success is measured in tasks achieved, not in years of life. Constant adaptation to new conditions is necessary to continued life, and life may be prolonged by timely adjustments. The difficulties of organizations circle about "lack of good leaders," "lack of good program making," "members losing interest," "trouble with other groups." Grappling constantly with these difficulties tends to lengthening the usefulness of organization, and extension help at these points seems much needed.

Studies of the social factors involved in the cooperative marketing of farm products have been made in co-operation with the Division of Cooperative Marketing. A study has been made of the problems connected with the cooperative marketing of potatoes by farmers in the Eastern Shore section of Maryland and Virginia. As a result, recommendations were issued with regard to proper relations between members and their associations. It was pointed out that accurate and adequate information on the part of the members and loyalty to the organization are fully as necessary to the success of a cooperative enterprise as the proper physical and economic conditions. Concrete suggestions were made for bringing about more active support of the organization by individual members and better dissemination of accurate information on the part of the management.

As a part of the bureau's special cotton-marketing study, this division undertook an investigation of cotton-marketing experiences and habits of farmers in North Carolina and Alabama. It was noted that where community life and social activities are strong and effective, cotton cooperation is strong and effective, and where community consciousness is weak and in-

dividualism on the part of the farmers is marked, cooperation itself is weak and difficult. The results of this study are being prepared for publication.

DIVISION OF LAND ECONOMICS

L. C. GRAY, *in charge*

LAND RESOURCES AND LAND UTILIZATION

Causes of the agricultural surplus have been studied, particularly the use of the tractor and resultant geographic shifts in crop and livestock production, the increased production of meat and milk per unit of feed consumed by farm animals, changes in crop yields per acre, and trends in exports and imports and in the domestic consumption of farm products. These studies furnish a background for estimating the probable changes in need for farm land and provide a basis for indicating the proper direction of a land policy.

Two preliminary reports have been prepared. The first, entitled "Do We Need More Farm Land?", was published in an economic journal and was also issued by the bureau and distributed to teachers in agricultural colleges and to members of the extension service in the several States. The second paper, entitled "The Trend of Agricultural Production," was read at a conference on population held at the University of Chicago. Talks based on these investigations have been given at meetings of county agricultural agents, extension specialists, and agricultural economists, held at the Universities of Minnesota, Wisconsin, and Illinois, and at Purdue University.

Two other studies, carried out in greater detail, have resulted from the investigations. Regional Changes of Farm Animal Production in Relation to Land Utilization and Regional Changes in Crop Acreage and Production Since the World War in Relation to Land Utilization are being prepared for publication. These studies show the extraordinary geographic shifts in land utilization and agricultural production that have occurred since the World War. Apparently shifts from one crop to another and from one class of livestock to another have had more effect upon aggregate production than changes in total crop acreage or in crop yields per acre.

The index of agricultural production, which has involved two years of statistical work, is now practically completed. This index, which includes

acreage, consumption, and production, provides basic data for studying changes in land utilization and the resultant effect on production and for determining the relationship of the trend of agricultural production to requirements for farm products. A report interpreting these data is in preparation.

A revised Graphic Summary of American Agriculture, consisting of over 300 maps and graphs, based on the 1925 census and later estimates, has been prepared. The Temperature, Sunshine, and Wind section of the Atlas of American Agriculture, prepared by the Weather Bureau with the aid of this division and under its general direction, has been published, and work on the soils section of the atlas has been continued.

LOCAL LAND UTILIZATION AND MARGINAL-LAND STUDIES

Large areas of marginal and submarginal land are in private ownership in many parts of the United States. The division has been engaged in a number of local studies of land utilization in various selected districts in such regions, in cooperation with the Forest Service and various experiment stations. The studies are directed specifically to problems arising in those marginal or submarginal districts where the land is already largely in farms and where the low productivity of the land is reflected in low incomes and low standards of living, farm abandonment, tax delinquency, inferior educational facilities, and poor roads.

A number of these studies have been carried on in the Appalachian area, notably in the mountains of Kentucky, and northern West Virginia. A new project has been started in Vermont. In this general region, agriculture, until recently, has been closely linked with forest industries, which have furnished employment and an outlet for surplus farm products, but the bulk of the merchantable timber has now been cut. On much of the land farming no longer pays, and many fields are being abandoned. The burden of carrying cut-over land is pressing heavily on the owners. The problem of future land utilization in the region is, therefore, of urgent interest both from the private and the public standpoint.

The studies have indicated their practical value as a basis for the development of State-owned forests through the differentiation of farm

from forest lands. They are useful in formulating agricultural extension programs. Extension workers will be able to give such advice as will eliminate a great deal of the friction incident to the transitional process from farming to other industries, and at the same time bring the transition about more quickly. On the basis of soil surveys, topographic maps, and miscellaneous data the results of such studies can be generalized to apply to much larger sections.

In certain submarginal districts extensive tax delinquency and farm abandonment have occurred, resulting in a rapid increase in the burden of local government. In cooperation with the United States Forest Service and the Wisconsin Agricultural Experiment Station, a study of taxation in relation to land utilization in certain districts of northern Wisconsin has been completed. The results of the study, published as Wisconsin Bulletin 406, show the need for land-use programs which aim to eliminate scattered settlement and assign land to its best uses. The many factors which must be taken into account in connection with a wiser land-use program are also presented in this bulletin. Largely as a result of this study, a suggested working plan for classifying land resources and formulating a land-utilization program for northern Wisconsin counties was prepared for use by county authorities and extension workers of the Wisconsin College of Agriculture.

LAND-SETTLEMENT STUDIES

The success or failure of agriculture in marginal areas is frequently dependent largely on methods employed in the sale and settlement of the land. The turnover of settlers in 46 settlements, representing various types of land-settlement projects in the cut-over region of the Great Lakes States, is being studied in cooperation with the experiment stations of Minnesota, Wisconsin, and Michigan, and with the Wisconsin Department of Agriculture.

A manuscript descriptive of the economic aspects of land settlement in the Great Lakes States (Wisconsin, Minnesota, and Michigan) has been nearly completed for publication as a farmers' bulletin. This manuscript presents graphically some of the fundamental conditions affecting the development of the cut-over region. It also describes the progress the average settler may expect to make in developing a farm on cut-over land.

With a view to establishing a widely recognized service on land-settlement questions, a special effort is being made to gain the cooperation of land-selling agencies, prospective settlers, and State and other public officials concerned with land-settlement activities. To satisfy the numerous requests for information concerning opportunities for settlement and methods of selling and settling land, 8,000 letters were mailed to public officials and land-selling agencies, requesting information relative to land for sale, prices asked, terms of purchase, how and where purchasers are solicited, etc. The response to these requests has been gratifying.

LAND APPRAISAL AND LAND VALUES

Results of the fourth annual survey of conditions in the farm real-estate market indicated that the decline in farm real-estate values had continued, but the decreases on the average were comparatively slight, amounting to about 1 per cent for the country as a whole. On March 1, 1929, the average value per acre of all farm lands with improvements stood at a point 16 per cent above 1912-1914 average regarded as the pre-war level, as compared with a position 70 per cent above that reached in 1920. The 1929 value levels varied considerably as between the various States, ranging from 60 per cent above the pre-war levels in California to 28 per cent below the pre-war levels in Montana. In some States, as in Montana for example, the decline appears to have reached an end, but in other States, as in Iowa, there was no assurance that the bottom had fully been reached. Although the survey showed that the rate of foreclosures and other defaults had on the whole declined somewhat for the 12 months to about 15 farms per 1,000 farms, the rate was still above normal in a number of States. Voluntary sales fell off somewhat during the period, and from the available evidence still remain much below normal.

These and other data indicative of trend and outlook in the farm-lands market were developed by the division to meet demands for authoritative information on the part of farmers, credit institutions, appraisers, and others closely concerned with the great changes which have taken place in the farm real-estate situation. A beginning only has been made in this work, and development must proceed appreciably further before demands for information in this comparatively new

field can be met adequately. This division participated in three short courses on land-valuation subjects conducted under the auspices of State agricultural experiment stations. The rapid development of this new type of educational activity in response to requests of individuals and agencies directly concerned with the practical problem emphasizes the increasing interest in the subject of land appraisal.

Continued progress was made on studies of various local factors influencing farm real-estate values. These investigations are being carried on in cooperation with the Bureau of Public Roads. Determination of the net effect upon farm value of buildings, roads, soils, etc., should aid in the development of improved land-appraisal methods and throw light on the problems of rural highway financing. An analysis of land values in the cut-over area of the Great Lake States, pursued cooperatively with the Minnesota Agricultural Experiment Station, is being prepared for publication.

LAND TENURE

Relationships between the tenure of farm land and various phases of agricultural production and marketing have been analyzed in a study of agricultural readjustment in the old plantation piedmont. This belt of 59 counties, mostly in South Carolina and Georgia, has been adversely affected by boll-weevil damage to cotton, drouth, low prices, and other unfavorable conditions since 1920. Much of the land was formerly operated by standing renters, and many of the holdings are large. It seems clear that the absentee owners have been less able to meet the situation than have owner operators. The family-size farm has withstood the shock better than the large plantation, although a few of the latter under capable management have adjusted their business to the changed conditions. A study of conditions of land tenure and their relation to income and financial progress of small white farmers in north Georgia has recently come from the press as Circular 78.

Analysis of the data made available by the 1925 census has been continued. Some of the material will be used in the Graphic Summary of American Agriculture, and some will probably be issued in a special publication which will deal with the relation of crop and livestock production to tenure. A special analysis of detailed information concerning farms 1,000 acres or

more in area is almost completed. Assistance has been given to investigators carrying on studies in land tenure in Delaware, Kentucky, and Virginia.

RELATIONSHIP OF THE PUBLIC DOMAIN TO THE AGRICULTURAL RANGE INDUSTRY

Need for better-defined legal authority for the use of the public domain as grazing land has been recognized for several years, but lack of agreement among users as to the best method of obtaining it has prevented legislative action. Believing that these differences of opinion rest on definite regional differences in physical, economic, legal, and social conditions which have never been clearly defined and understood, steps were taken in 1927 to make detailed studies of representative districts. The State of Nevada, which contains about one-third of the remaining public domain, was selected as the special field of study.

This study is nearing completion. A map showing present ownership and type of utilization now practiced is finished. A map of the authorized use of water for irrigation and for stock-watering places has been prepared. The irrigable land shows the area which can be cropped and which now furnishes part of the winter feed for stock. The location of watering places indicates the distribution of the privately controlled stock water, on both private and public lands, and under State laws helps to establish the limits of the indefinite permissive control of the range lands now legally recognized.

A map of certain representative areas showing the privately owned lands of individual stockmen, their stock-water holdings, and the boundaries of the areas of associated public lands that they claim the right to use is now being prepared. This map will present graphically (1) the intermingling of interests sometimes common, sometimes competitive, due to the overlapping of claims, and (2) the need for better and more authoritative delimitation of the boundaries of use rights.

In connection with the study, a summary of the Federal and State legislation and various judicial decisions relative to the use of public lands and the control of waters in Nevada has been made. This summary not only shows what has been done but also indicates the need of further definitive action in order to improve the legal status of the range livestock industry.

FARM LABOR

In December, 1928, a questionnaire concerning the relative amounts of time spent on farm work by various classes of farm labor, family (paid and unpaid) and hired, and the amounts of wages paid each was sent to correspondents throughout the country, and tabulation of replies has been begun. Summarization of data received from an inquiry of a year earlier concerning monthly wage payments by farmers to various classes of labor has been practically completed.

A preliminary report entitled "The Perquisites and Wages of Hired Farm Hands" has been issued, giving the principal results of the study concerning money wages and payments in kind to noncasual and casual hired farm laborers. These studies reveal the large relative importance of perquisites as a method of paying farm wages and indicate the relative importance of different classes of perquisites. This makes possible more complete estimates of real, as distinguished from money, wages of farm laborers.

TOBACCO SECTION

CHARLES E. GAGE, *in charge*

To provide for duties which recent legislation has imposed on the Department of Agriculture, a new unit known as the Tobacco Section has been organized. This section will administer the tobacco stocks and standards act, approved January 14, 1929, providing for quarterly reports on the stocks of leaf tobacco in the hands of dealers and manufacturers, formerly issued by the Department of Commerce, and will inaugurate the tobacco-grading service provided for in the appropriation act for 1930.

Under the provisions of the tobacco stocks and standards act, the April 1 and July 1 tobacco-stocks reports show for the first time not only a complete separation according to type but a separation of new and old crops. Preliminary work has been accomplished in preparation for a further separation of stocks according to groups of grades, which will have the effect of disclosing the quantity of tobacco on hand according to its manufacturing utility. Sufficient progress has been made to indicate that reports on this basis can be undertaken in the near future. These reports will make available much more adequate statistics on tobacco than are now available.

Although the appropriation for tobacco grading did not become available until July 1, 1929, plans were formulated, and preparatory work was accomplished for the inauguration of this new service. Under the terms of cooperative agreements, negotiated with numerous tobacco-producing States, the nucleus of an organization has been created which will enable tobacco growers to know the grade of their product according to Federal standards before it is sold. It has been demonstrated that such services tend to improve and stabilize prices. Favorable comments have been received from the growers and the tobacco trade in regard to this new activity.

COLD-STORAGE STATISTICS

WILLIAM BROXTON, *in charge*

According to the latest summary of the cold-storage industry, there are 1,363 establishments engaged in storing food products under refrigeration. Practically all of these furnish information to this bureau; consequently it is believed that the reports on cold-storage holdings as issued represent close to 100 per cent of the total tonnage of such commodities stored throughout the United States. The reports cover fresh fruit, frozen and preserved fruits, dairy products, eggs, frozen poultry, meats, and meat products.

There is an active demand for data on cold-storage holdings, and several extensive special tabulations were prepared for producers' organizations and others. The slaughterhouse statistics compiled in this section have been in demand, especially in connection with the subject of direct marketing of livestock.

OPERATION OF CENTER MARKET

C. H. WALLEIGH, *superintendent*

The operation of Center Market, Washington, D. C., has been continued along lines laid down in previous years. Repairs and alterations have been held to the minimum in view of pending legislation to discontinue the market in order that the space may be used in carrying out the Federal building program. Only such repairs as were necessary for sanitation and efficient operation were made. Financial reports filed by all stand holders with the market show gross sales, volume of business handled, and expenses incurred in its conduct.

ECONOMIC LIBRARY*MARY G. LACY, in charge*

A steady increase in the demand for the services of the library on the part of the public as well as from departmental workers marked the year's progress. An unusually large number of bibliographies were undertaken in response to definite and urgent requests. These bibliographies included such subjects as labor requirements of farm products; agricultural relief; population movements; large-scale and corporation farming; land valuation; agricultural credit; and numerous others. A member of the staff won the Eunice Rockwood Oberly Memorial prize for a bibliography entitled "Control of Production of Agricultural Products by Governments."

Additions to the library included 3,483 books and a net increase of 31 periodicals. A total of 1,759 periodicals is now received. In addition extensive files are maintained of current reports covering crop and market conditions and related subjects. Special files are kept of foreign material, including reports from the bureau's foreign representatives, consular reports, reports from foreign governments, etc. Approximately 19,000 reports are circulated annually, both within and without the bureau.

The library handles a large correspondence, which entails much reference and research work.

DIVISION OF ECONOMIC INFORMATION*J. CLYDE MARQUIS, in charge*

The volume and variety of economic information continues to grow rapidly. The inauguration of new lines of service and research in the bureau has added to the information work. The expansion of the current work in crop estimates, market news, and research has brought many new types of information into the bureau which must be prepared in the form which will be of greatest service to those who need the facts.

One of the main tasks of the division has been to coordinate and systematize the publications of the bureau. The purpose is to bring economic information into certain definite groups of publications so as to make it most useful to extension workers and others. This has become necessary because of the extension of outlook work into practically every State, since this work calls for information classi-

fied by commodities and regions. The calls upon the bureau for information are reflected by constantly increasing correspondence, and the further fact that editions of publications are quickly exhausted. Facilities for printing and mimeographing have been taxed to the utmost.

PRINTED PUBLICATIONS

The printed bulletins of the bureau have had to be supplemented during the past year by an increased volume of multigraphing and mimeographing. The preparation of manuscripts for regular department printed publications has been limited to those which were most urgently needed in large quantity. The distribution of information has been increased in the form of multigraphs and mimeographs as much as the facilities of the bureau and department would permit. Every economy has been practiced that would facilitate securing more output with the same facilities, such as single-spacing copy, duplicating on both sides of the paper, and very close editing.

A comprehensive survey of the probable printing needs of the bureau during the next two years has been made and prospective manuscripts listed in order to present accurate estimates of the future needs in the form of printed publications. These estimates show that the bureau still has a large amount of material in the form of unanalyzed data which should be written into useful publications.

The regular periodicals of the bureau have been continued. No new periodicals have been started during the year, but the distribution of all those now issued continues to expand.

Of printed publications including bulletins, circulars, service announcements, etc., the output of the year was 46. Ninety-one preliminary and special reports were published in either multographed, mimeographed, or rotaprint form. This number is about three times the output of the previous year and has helped greatly in meeting the urgent demand for economic information.

PRESS DISTRIBUTION OF BUREAU FACTS

The press still remains the greatest single method of distributing this bureau's information, with a larger body of readers than ever before, due to increased circulation among newspapers and periodicals. Information for the current newspapers, farm, and

trade papers has been released in increasing volume. Through the department press service about 250 formal statements have been issued during the year. A large number of reports were given to the press association and local correspondents for special handling according to the needs of each publication. The press clipping service is inadequate to measure the amount of this copy that has been used, but it amounts to thousands of items annually.

Bureau information gets its widest distribution through the daily and weekly newspapers and these papers are served principally through the Washington offices of the news syndicates. A survey of the distribution of market reports issued by the Division of Livestock, Meats, and Wool showed that through the news syndicates a total of 682 newspapers were being reached, representing all parts of the country, the total circulation of which amounts to many millions daily or weekly.

Press distribution of information has been increased by the preparation of more special articles for farm journals and daily and weekly papers. Over 100 special articles have been written on bureau work for periodicals. Independent special writers have been furnished material which has appeared in many places.

Arrangements have been made with many of the papers to use the bureau's information in regular departments. These include some of the leading livestock papers, fruit-trade journals, and general farm papers.

RADIO NEWS SERVICE

The radio market news service has been expanded, and approximately 115 stations are cooperating with the bureau. The character of material broadcast has been improved. The joint program in cooperation with several of the New England State bureaus of markets has been continued. A joint program was begun in January in cooperation with the Alabama Division of Markets at Montgomery, the broadcasting being done through the station located at Birmingham through remote control. This addition made radio reports available to a large section heretofore somewhat removed from a station.

A new program of livestock reports was developed at Omaha. The Missouri State Department of Agriculture installed an additional operator on the

leased wire so as to be able to use both livestock and fruit and vegetable information, thereby making the program from that station one of the most complete in the country.

Steps were taken toward closer co-operation in radio and market-news work in New York City. A joint operating committee on radio was appointed and duplication of broadcastings eliminated.

A plan for a national system of market broadcasting has been outlined and extensions during the year planned in accordance with this layout, the objective being to make both local and national markets available during both day and night periods to all farmers in the country.

As a part of the chain broadcasting program of the department, the bureau has contributed a large number of short talks during the year. The most important statements of the bureau on crop reports, outlook statements, the monthly price situation, etc., have been broadcast by bureau workers over the chains reaching about 40 stations. Economic talks have also been prepared for the department's syndicate radio service, which is furnished to more than 30 stations.

EXHIBITS AND FILMS

The exhibit section assisted in preparing material for one European exposition and five national shows in this country, which included the exposition at Seville, Spain, the National Dairy Exposition, the National Cotton Show, International Livestock Exposition, American Farm Bureau Exhibit, and the Chemical Industries Exposition.

The bureau display for the National Cotton Show constituted almost all of the department's contribution.

Supplementing the preparation of exhibits for large expositions, special displays have been prepared for several smaller shows. Small portfolios for use at farmer's meetings have been completed on a dozen lines of bureau work and are kept in constant circulation.

In cooperation with the visual education section of the Extension Service, a number of film-strip lectures have been prepared for extension workers. Over 20 different subjects are now in preparation.

During the year four new motion pictures have been completed. One depicted the master-farmer movement in Oklahoma and was prepared in co-operation with Oklahoma agencies.

Another showed the use of the new combine harvester. A film was made on lamb-cutting demonstrations, in cooperation with the National Livestock and Meat Board. One showed the co-operative marketing of livestock.

AIDS FOR ECONOMIC EXTENSION

A number of special publications to aid extension workers in presenting the Outlook Report were developed. Collections of charts were issued and distributed to all State outlook workers. Two handbooks, one on livestock and one on crops, were prepared, each containing over 100 of the most significant charts.

Enlarged wall charts, prepared by the photographic laboratory upon bromide paper, were furnished to extension workers in each State. To introduce the charts, 35 on different subjects were furnished free to each State, and then orders for additional charts were filled at a small charge for the cost of preparation. Over 2,500 copies of these charts were distributed following the outlook conference in January. They have been universally approved and have been a large factor in the extension of the outlook information. The revision of

these charts for use in connection with later outlook reports has been continued, and they will be issued in handbook form for use with later reports.

The director of economic information has attended several meetings of teachers of agriculture in high schools and described the material which the bureau has available for teaching agricultural economics. The result has been shown in calls from these teachers and the adoption of outlook work as a regular part of the course of study by some of these schools.

LEGISLATIVE SERVICE

The agricultural legislative service, begun last year at the suggestion of the National Association of Marketing Officials, has proved its usefulness. Through this service a constant record is made available to agricultural leaders of congressional action on bills relating to marketing or the department or bureaus, as well as a review of cases in the courts relating to marketing and other subjects of interest to marketing specialists and others. A valuable file of information on agricultural legislation is being accumulated, and various offices are making more and more use of the service.

